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# Application of the family stress model in populations of rural Latina mothers

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**Application of the family stress model in populations of rural Latina mothers**

by

**Kimberly D. Doudna**

A dissertation submitted to the graduate faculty  
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Human Development and Family Studies

Program of Study Committee:  
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Ames, Iowa

2016

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## DEDICATION

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Finally, this dissertation is dedicated to my family. To my husband John, who saw my potential and encouraged me to start graduate school. To my daughters Evelyn and Amelia, who were my guiding lights as I finished this process.

## TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS .....	v
ABSTRACT.....	vi
CHAPTER 1    GENERAL INTRODUCTION.....	1
Introduction .....	1
Dissertation Organization .....	4
Literature Review.....	5
Overarching Research Question .....	12
Rural Families Speak .....	13
Rural Families Speak about Health.....	14
Measures ... ..	15
References.....	19
 CHAPTER 2    MATERNAL DEPRESSIVE SYMPTOMS AND PARENTING ALLIANCE AS MEDIATORS BETWEEN HOUSEHOLD FOOD INSECURITY AND CHILD BEHAVIOR AMONG RURAL LATINO IMMIGRANT FAMILIES.....	29
Abstract.....	29
Introduction .....	29
Methods .....	36
Results .....	41
Discussion ... ..	43
References ... ..	48

CHAPTER 3	MATERNAL DEPRESSIVE SYMPTOMS AS A MEDIATOR BETWEEN MATERIAL HARDSHIPS AND CHILD HEALTH.....	64
Abstract	.....	64
Introduction	.....	64
Methods	.....	70
Results	.....	75
Discussion	.....	76
References	.....	80
CHAPTER 4	GENERAL DISCUSSION AND CONCLUSION.....	90
General Discussion	.....	90
References	.....	95
APPENDIX	IRB FORMS .....	97

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## ABSTRACT

Guided by the Family Stress Model, the two studies in this dissertation examine relations between household food insecurity, maternal depressive symptoms and child outcomes among rural Latino families who have low household incomes. The studies used data from two different, yet related, multi-state research projects. Path analysis was conducted in both studies to determine the relations between variables, and to test for mediation effects. The first study examined relations among food insecurity and internalizing and externalizing behaviors of children, and the indirect effects of maternal depressive symptoms and alliance between parents. The second study examined relations among household food insecurity, medical need, maternal depressive symptoms and child health problems. Data analyses revealed that more depressive symptoms among mothers were associated with less alliance among parents (Study 1), as well as more health issues among children (Study 2). Results may suggest that improving mothers' mental health may lead to stronger alliance among parents, as well as fewer health problems among children. Additionally, it is important that professionals who work with rural Latino families that have low household incomes are aware of the link between maternal depression, parenting, child health and food insecurity, and are prepared to refer families to resources that can provide holistic support

## CHAPTER 1: GENERAL INTRODUCTION

Food insecurity and depression among rural families are growing public health concerns. Household food insecurity is a multifaceted phenomenon that centers on constrained and irregular accessibility of, and ability to acquire food (Anderson, 1990). Depression is a mental condition that consists of symptoms such as sadness, loss of interest in previously enjoyable activities, guilt, altered sleep patterns and difficulty concentrating (World Health Organization, 2010). Food insecurity and maternal depression increase the risk of disrupted family dynamics and increase the risk of a child's needs being unmet (Ashiabi & O'Neal, 2008). Household food insecurity increased from 10.3 percent of U.S. households in 1995 (Food and Nutrition Service, United States Department of Agriculture, 1999) to 14 percent in 2014 (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2015). The rate of food insecurity was higher in rural areas than in large cities, suburban, and exurban areas (outlying areas beyond suburban areas)(Coleman-Jensen, et al., 2015). In 2013, nearly 7 percent of U.S. adults experienced a major depressive episode in the past year (Substance Abuse and Mental Health Services Administration, 2014). This percentage has remained stable since 2005. The percentage of rural residents who experienced a major depressive episode in the past year was slightly higher, 7.3 percent in 2013 (Center for Behavioral Health Statistics and Quality, 2014). Among rural women who have low household incomes, the estimates of major depressive episode (44.3 percent) are significantly more common (Hauenstein & Peddada, 2007).

While food insecurity and depressive symptoms are a concern for rural families, they are also a concern for Latino families. Food insecurity is more prevalent among



Latinos households (22.4 percent) than among the U.S. households as a whole (14 percent) (Coleman-Jensen et al., 2015). Additionally, even though the percent of Latinos with a major depressive episode in the past year is lower than that of among all U.S. adults (5.8%, 6.7% respectively), depression is a concern among the Latino population (Substance Abuse and Mental Health Services Administration, 2014). In addition to being the largest minority group in the U.S. (17% of the U.S. population), Latinos account for more than 50 percent of the total population growth in the U.S. during the past ten years (Krogstad, 2014). Moreover, the Latino population has increased across rural America. Between 2010 and 2013, there was a 2.1 percent increase in the Latino population in non-metro areas, compared to a -0.2 percent decrease for non-Latinos in non-metro areas (Rural Hispanic Population Growth Mirrors National Trends, 2014). Additionally, between 2000 and 2010, the Latino population increased by 49% in the Midwest (Ennis, Rios-Vargas, & Albert, 2011). In a study of rural children who lived in households that had low incomes, Evans and English (2002) showed that exposure to numerous physical and psychosocial stressors elevate the risk of socioemotional difficulties among rural children. Thus, the impact of multiple stressors such as food insecurity and depressive symptoms on rural Latino families that have low household incomes may be substantial.

The Family Stress Model (FSM) (Conger & Elder, 1994), which proposes that economic hardship increases the risk of negative family functioning, parenting and child well-being, guides the studies in this dissertation. Parke and colleagues (2004) examined economic stress, parenting, and child adjustment in Mexican American families in California, while this dissertation examines Latina mothers living in rural areas across the nation, the majority of whom are first generation immigrants. While the FSM originally

posited how socioeconomic status affected adult romantic relationships (Conger & Conger, 2002), it was later posited that socioeconomic status impacts parenting and child development (Conger & Conger, 2002). The FSM proposes that economic hardship is positively associated with economic pressure (perceived economic constraints and economic adjustments), and that both economic hardship and economic pressure are positively related to emotional and behavioral problems among parents. Such problems are related to harsh and inconsistent parenting, and mediated by the degree of conflict between parents. In turn, harsh, inconsistent parenting is hypothesized to have a positive association with child emotional and behavior problems (Conger & Conger, 2002). The FSM provides a framework in which to explore the economic hardship of household food insecurity, emotional and behavioral problems related to maternal depressive symptoms, and behavior problems of children in rural Latino households.

In this dissertation, data from two multi-state Experiment station research projects are examined to understand how stressors experienced by rural Latino families are related to child behavior and child health. The Family Stress Model is applied as a theoretical underpinning in both studies. The first study will use data from the Rural Families Speak about Health project to examine relations between household food insecurity, maternal depressive symptoms, alliance between parents, and child behaviors among rural Latino families who have low household incomes. The second study will use data from both the Rural Families Speak project, and the Rural Families Speak about Health project, to examine relations among household food insecurity, maternal depressive symptoms, and child health among rural Latino families. The Rural Families Speak project was based on data collected from 534 rural families across 17 states that had low household incomes

between 2002 and 2007, and was primarily focused on family economic well-being in the context of the 1996 federal welfare reform (Bauer, 2004; Bauer & Katras, 2007). The Rural Families Speak about Health project was based on data collected in 2011 from 444 rural families across 13 states that had low household incomes and primarily focused on the mental and physical health of families (Mammen & Sano, 2013).

### **Dissertation Organization**

This dissertation is organized using the manuscript format, and the manuscripts included in the dissertation will be submitted for publication. In Chapter 2, the first manuscript, “Maternal Depressive Symptoms and Parenting Alliance as Mediators between Household Food Insecurity and Child Behavior among Rural Latino Families”, will be prepared for submission to the *Journal of Child and Family Studies*. The purpose of this study was to learn how stressors experienced by rural Latina mothers affect the behaviors of their children through examining the statistical relations among household food insecurity, maternal depressive symptoms, parenting alliance, and child behaviors. The model was tested using Mplus software to examine direct and indirect effects of the hypothesized mediators. In Chapter 3, the second manuscript, “Maternal Depressive Symptoms as a Mediator between Material Hardships and Child Health among Rural Latino Families”, will be prepared for *The Journal of Rural Health*. This study examined the statistical relations among household food insecurity, maternal depressive symptoms and child health in two separate data sets. The model was tested for each data set used Mplus software to examine direct and indirect effects of the hypothesized mediator. In Chapter 4, I conclude with a synthesis of the results, discussion, and implications of the two studies.

## **Literature Review**

### **Household food insecurity**

As a part of the unofficial War on Poverty, the Food Stamp Act (P. L. 88-525) became law in 1964, cementing the federal government's role in helping people obtain food. This law has undergone many changes, and today, the Supplemental Nutrition Assistance Program (SNAP), has replaced what was formerly referred to as the Food Stamp Program. SNAP participation has been associated with reduced household food insecurity (Mabli, Ohl, Dragoset, Castner, & Santos, 2013). The estimated average SNAP benefit for a family of four in 2015 was \$459.00 per month (Center on Budget and Policy Priorities, 2015), and prices for food such as retail meat, eggs, fish and seafood, dairy, and fresh fruit have continued to increase due to the interplay between climate change and economic forces (Economic Research Service USDA Food Price Outlook, 2016). Despite programs that assist families with purchasing food, households still experience food insecurity. Household food insecurity was first measured quantitatively by the USDA in 1995 as a way to examine how many households in the United States were experiencing food insecurity. The development of this quantitative measure was partially in response to an increased demand for emergency food by individuals and families that occurred in the 1980s (Food Research and Action Center). Household food insecurity affects families by acting as a stressor that is linked to depression.

### **Household food insecurity and depression among rural families**

Numerous cross-sectional (Olson, Anderson, Kiss, Lawrence, & Seiling, 2004), as well as longitudinal studies (Lent et al., 2009; Huddleston-Casas, Charnigo & Simmons, 2009; Browder, Greder & Jasper Crase, 2013) of rural families who have low household

incomes have demonstrated a significant relationship between household food insecurity and maternal depressive symptoms. Maternal depressive symptoms among food insecure households at time 1 were associated with households remaining food insecure at time 3. Unemployment mediated the relation between depressive symptoms and household food insecurity (Lent et al., 2009). Another longitudinal study by Huddleston-Casas and colleagues (2009) examined how household food insecurity and maternal depressive symptoms interacted over time. Household food insecurity and maternal depressive symptoms predict each other over time, indicating a parallel causal relationship. Browder and colleagues (2013) found that rural Latina immigrant mothers whose depressive symptoms remained high had increased levels of food insecurity when compared to mothers with consistently low depressive symptoms. The research overwhelming points to depressive symptoms and household insecurity as factors that impact rural mothers. This dissertation adds to the literature by examining how these factors are related to child behavior and child health.

### **Latino child health**

Latino children have higher odds of obesity, and poor physical and dental health when compared to native born White children (Yu, Lin & Adirim, 2013). Additionally, Latino children are more likely to be hospitalized and die due to injuries (Agran, Winn, Anderson, & Del Valle, 1998), have less than optimal health status, (Flores, Bauchner, Feinstein & Nguyen, 1999) and are less likely to receive the following: vision screening, prescriptions, adequate pain medication, and high quality care for asthma and gastroenteritis (Flores, Abreu, Olivar, & Kastner, 1998).

## **Household food insecurity and child health**

There are serious health related implications for children who experience household food insecurity. These risks can begin prenatally, and include birth defects (Carmichael, Yang, Herring, Abrams, & Shaw, 2007). Among food insecure children under age three, iron deficiency with anemia is twice as likely to occur when compared to food secure children (Skalicky et al., 2006). Young children's general health can also be impacted, with parents of food insecure preschoolers more likely to rate their child's health lower and for those young children to be hospitalized for health problems (Cook et al., 2004). The odds of parents rating their child's health lower was associated with households that were consistently food insecure (Ryu & Bartfeld, 2012). More Latino children reside in households that are food insecure than White, non-Hispanic children (29% and 15% respectively) (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2015). Further, of the 89 counties with a majority Latino population in 2013 (3% of all counties in the U.S.), more than one-fourth (27%) are among the top 10 percent of counties with the highest rates of household food insecurity among children (Gundersen, Satoh, Dewey, Kato, & Engelhard, 2015). While data about household food insecurity and Latino child health is limited, research shows that children who are food insecure are more likely to have anemia, asthma, fatigue, stomachaches, headaches, and colds than food secure children (Ogata, Hayes, & Billings, 2014). Household food insecurity is related to obesity in Latino immigrant children (Buscemi, Beech, & Relyea, 2011). The relation between household food insecurity and child health is important to examine, given that Latino families experience disproportionate levels of household food insecurity.

### **Maternal depressive symptoms and child health**

Maternal depressive symptoms are related to child health. The odds of lower rated health for children were associated with parents' depression. Parental depression was also negatively associated with child health, whereas medical need was found to have an indirect effect on child health through parental depression (Ashiabi & O'Neal, 2007). Children whose parents had psychiatric symptoms were more likely to be frequently ill, with a higher frequency of fever related illnesses. (Caserta, et al., 2008).

### **Influences on children's behaviors**

In children, externalizing behaviors are characterized by aggression, noncompliance, and hyperactivity, while internalizing behaviors are characterized by anxiety, depression, and withdrawal. Externalizing and internalizing behaviors in young children are related to other issues, such as a lack of effortful control (Murray & Kochanska, 2002), peer rejection (Wood, Cowan, & Baker, 2002), and academic difficulties (Hinshaw, 1992) during middle childhood.. There are long term associations of externalizing behavior problems with substance abuse (King, Iacono, & McGue, 2004), smoking (Helstrom, Bryan, Hutchison, Riggs, & Blechman, 2004), antisocial outcomes (Lynam, 1996), underachievement (Hinshaw, 1992), and lower graduation rates from high school (McLeod & Kaiser, 2004). Similarly, there are long term associations of internalizing behavior problems with adolescent depression (Reinherz, Giaconia, Pakiz, Silverman, Frost, & Lefkowitz, 1993), illegal substance use (King et al., 2004), and increased risk of high school dropout (McLeod & Kaiser, 2004).

Children had higher odds of behavior problems when their mother was food insecure, even after adjusting for mother's mental health issues and other covariates (Whitaker, Phillips & Orzol, 2006). The association between food insecurity and child behaviors is mediated by parenting stress (Huang, Oshima, and Kim, 2010). Family background and characteristics of parents had a strong impact on child behaviors (Huang, Oshima, and Kim, 2010). Belsky, Moffit, Arseneault, Melchoir and Caspi (2010) found maternal characteristics of mothers of food insecure children included being less open to experience, less reliable, less affable, less extraverted and more anxious (Belsky, Moffit, Arseneault, Melchior, & Caspi, 2010). Meta-analyses provide further evidence that household food insecurity is a stressor with direct and indirect effects on behavior in children (Perez-Escamilla & Vianna, 2012). This dissertation will add to the literature by examining household food insecurity and child behavior and the mediating roles of depressive symptoms and parenting alliance among rural Latino families, a population that is underrepresented in research.

Household food insecurity is not the only stressor related to child behavior. Maternal depression increases the risk for internalizing and externalizing behavior problems among children (Coyne & Thompson, 2011; Goodman, Rouse, Connell, Broth, Hall & Heyward, 2011). Meta-analyses provide further evidence of direct effects between maternal depression and children's internalizing and externalizing behaviors (Goodman et al., 2011). Stronger effect sizes were found for younger children, while there was a stronger effect size for girls when looking at maternal depression and internalizing behavior. More research is needed to examine different types of risk factors in mothers and children that are associated with internalizing and externalizing behavior problems in



children (Goodman et al., 2011). This dissertation explores the combination of household food insecurity, depressive symptoms, and parenting alliance as risk factors that may contribute to behavior problems in children.

Not only are maternal depressive symptoms shown to impact child behaviors, they impact parenting behaviors as well. Maternal depression constrains a mother's capability to nurture children (Gotlib & Goodman, 1999; Kiernan & Huerta, 2008). Due to maternal depression, the home may be more stressful (Marmorstein, Malone, & Iacono, 2004) and the mother may be more negative and hostile to her children (Downey & Coyne, 1990; Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Meta-analyses provide further evidence of direct effects between maternal depression and negative parenting behavior (Lovejoy, et al., 2000).

Parenting alliance, defined as how primary caregivers work together and communicate about their shared task of child-rearing (Weissmann & Cohen, 1985), is typically studied among White, middle class populations. A weaker alliance between primary caregivers is associated with adjustment and behavior issues among children and adolescents (Feinberg, Kan, & Hetherington, 2007; McConnel & Kerig, 2002). Cabrera, Shannon, Mitchell, & West (2009) examined a nationally representative sample of Mexican-American parents, and found that alliance was not related to adjustment of 2 year-olds. However, among Latino parents, a weaker parenting alliance predicted more externalizing problems for young adolescent sons (Lindahl & Malik, 1999). It may be that child age and stage of development is a moderator in the relation between parenting alliance and child behavior problems.

### **Medical need and depression**

Delays in medical treatment, delays in purchasing medicines, and low health care system usage are all indicators of medical need (Ashiabi & O'Neal, 2007). Although medical need is seldom isolated as a specific type of material hardship, and little is known about medical need as a construct, Ashiabi and O'Neal (2007) found that medical need was associated with depression. A characteristic of medical need, lack of medical care, was positively associated with an increased risk of depression among parents who are not married (Heflin & Iceland, 2009). ).

### **Theoretical framework**

The Family Stress Model originally posited how socioeconomic status affected adult romantic relationships (Conger & Conger, 2002), and it was later extended to posit how socioeconomic status impacts parenting and child development (Conger & Conger, 2002). Economic hardship (not having enough income to meet needs) and economic pressure (the perceived inability to purchase basic needs) are positively associated with emotional and behavioral problems among parents, which in turn can lead to harsh and inconsistent parenting, and is mediated by inter-parental conflict Conger and Conger (2002) posit that harsh and inconsistent parenting predicts increased child emotional and behavioral problems. In the extended FSM, a main hypothesis is that economic hardship and child problems are mediated by disrupted parenting (Conger, Conger & Martin, 2010).

This model is a good fit for the studies because household food insecurity and medical need are types of economic hardships. Maternal depressive symptoms are related to the theory because depression involves emotions and behaviors that are problematic for

other family members. Parenting alliance is related to how disrupted family relations are or are not.

In this dissertation, the Family Stress Model is applied to examine relations between family stressors and child outcomes among Latino families living in rural America. Household food insecurity, maternal depressive symptoms and parenting alliance may each operate differently among rural Latino families, and in turn could impact child behaviors. Material hardships such as household food insecurity and family medical need, as well as maternal depressive symptoms may impact child health in unique ways.

### **Overarching Research Question**

The overarching research question addressed in this dissertation is, “What are the relations between individual and household stressors and child outcomes?”. The Family Stress Model (Conger & Conger, 2002) is applied as a theoretical underpinning to help understand these relations in two studies. In particular, I am interested in how individual and household stressors that rural Latino households experience are related to child behavior and child health. This overarching research question will be explored via two studies of rural Latino families. The first study uses data from a multi-state project, Rural Families Speak about Health (Mammen & Sano, 2013). The second study uses data from both the Rural Families Speak (Bauer, 2004; Bauer & Katras, 2007) and Rural Families Speak about Health (Mammen & Sano, 2013) projects. The Rural Families Speak project examined the economic well-being of rural low-income families in the context of the 1996 federal welfare reform (Bauer, 2004; Bauer & Katras, 2007). The Rural Families Speak about Health project examined the mental and physical health of rural low-income

families (Mammen & Sano, 2013). In this dissertation, the first study hypothesized that household food insecurity is positively associated with depressive symptoms among rural Latina mothers, and positively associated with internalizing and externalizing behaviors among rural Latino children. Additionally, maternal depressive symptoms and alliance between parents are predicted to mediate the relation between household food insecurity and children's behaviors. . The second study hypothesized that food insecurity and medical need are positively associated with depressive symptoms among rural Latina mothers, and positively associated with health problems among rural Latino children. Maternal depressive symptoms are predicted to mediate the relations among household food insecurity and medical need (material hardships) and children's health problems.

### **Rural Families Speak**

The Rural Families Speak project was developed to study the economic well-being of rural low-income families after the 1996 federal welfare reform (Bauer, 2004; Bauer & Katras, 2007). Between 2002 and 2007, three waves of quantitative and qualitative data were collected via in-person interviews with families across 17 states (N = 523) (Bauer, 2004; Bauer & Katras, 2007). In order to participate in the study, mothers had to have at least one child under the age of 13 living in her household, have a household income at or below 200% of the Federal Poverty Level, and live in a county with a population of 19,000 or less. Counties were classified as a Rural-Urban Continuum Codes of 6, 7, or 8 using the county classification system of the U. S. Department of Agriculture (Butler & Beale, 1994). Codes 6 and 7 represent non-metropolitan counties with an urban population between 2,500 and 19,000. Code 8 counties exclude towns of more than 2,500. Four of the 17 states in the study (Michigan, Oregon, California, and Iowa) chose to oversample

Latina mothers. The other states sampled mothers representative of the low-income rural population (Bauer & Katras, 2007). Annual semi-structured two hour interviews were audiotaped and conducted with mothers in their homes or in a location that ensured privacy (e.g., private conference room at a library). Data were collected pertaining to mothers' household structure, income, and food security status, if they owned or rented their home, as well as the condition of their home (e.g., broken windows). Data were also collected regarding mothers' physical and mental health, social support she received, and her confidence in parenting (Bauer, 2004; Bauer & Katras, 2007). Quantitative data were entered into the Statistical Package for the Social Sciences (SPSS) (Bauer, 2004; Bauer & Katras, 2007). For qualitative data, transcripts were transcribed, translated from Spanish to English for interviews conducted in Spanish, and entered into WinMax, a software program for managing and analyzing qualitative data.

### **Rural Families Speak about Health**

The Rural Families Speak about Health project began due to empirical studies based on the Rural Families Speak project that pointed to a need for more research regarding physical and mental health among rural families who had low household incomes (Mammen & Sano, 2013). Academics from diverse academic backgrounds, many whom were a part of the Rural Families Speak project, designed the study to collect quantitative and qualitative data related to mental and physical health. Between 2010 and 2012, one wave of quantitative (N = 444) and one wave of qualitative data (N = 86) were collected across 13 states (Mammen & Sano, 2013).

In order to participate in the study, mothers had to have a minimum of one child under the age of 13 living in her household at least 50% of the time, have a household

income at or below 185% of the Federal Poverty Level, and live in a county designated as having an Urban Influence Code of six or more (ERS, USDA, 2007). A UIC of 6 defines a county as “noncore adjacent to small metro area and contains a town of at least 2,500 residents” and a UIC of 10 as “noncore adjacent to micro area and does not contain a town of at least 2,500 residents” (ERS, USDA, 2007). Higher UIC codes indicate more rural counties. Interviews were held in mothers’ homes or in a location that ensured privacy (e.g., private conference at library). Participants’ responses were immediately entered into a secure computer, and sent directly to Bureau of Sociological Research (BOSR), University of Nebraska-Lincoln and included both quantitative and qualitative data about their household composition, income, household expenses, housing, food security status, physical and mental health, social support and parenting (Mammen & Sano, 2013). For the qualitative data, the transcripts were transcribed verbatim, translated from Spanish to English for interviews conducted in Spanish, and then uploaded into MaxQDA, a computer software program to assist with data management and analysis.

## **Measures**

### **Household food insecurity**

Household food insecurity was measured using the Six-Item Short Form of the USDA Household Food Security Module and the associated Six-Item Food Security Scale (Bickel, Nord, Price, Hamilton, & Cook, 2000). Some questions required mothers to choose “Often true”, “Sometimes true” or “Never true” to questions such as “I couldn’t afford to eat balanced meals.” and “The food that I bought just didn’t last, and I didn’t have money to get more”. Other questions required a yes or no response, such as “In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money

for food?” and “In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?” In RFS, household food insecurity was measured by the 18-item U.S. Household Food Security Module with a 12-month reference period (Hamilton et al., 1997). Household food insecurity was measured in RFSH by asking the mothers questions in the Six-Item Short Form of the USDA Household Food Security Module and the associated Six-Item Food Security Scale (Bickel, Nord, Price, Hamilton, & Cook, 2000).

### **Maternal depression**

In RFS, depressive symptoms were measured by the CES-D, a 20-item instrument used to capture the level of depressive symptoms during the previous week (Radloff, 1977). In RFSH symptoms for depression among mothers was measured using a shortened form (Andresen, Malmgren, Carter, & Patrick, 1994) of the Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977). Mothers reported how often they felt or behaved in response to ten statements such as I had trouble keeping my mind on what I was doing and I felt that everything I did was an effort. Responses options include: rarely or none of the time, some or a little of the time, occasionally or a moderate amount of time, and all of the time. Comparable items between the two measures asked about feeling bothered, trouble keeping mind on task, feeling depressed, feeling everything was an effort, feeling hopeful, feeling fearful, having restless sleep, feeling happy, feeling lonely and feeling like they cannot get going. Both the long and short form of the CES-D are reliable and valid for Latino populations (Reuland, Cherrington, Watkins, Bradford, Blanco & Gaynes, 2009; Roberts, 1980).

### **Parenting alliance**

The Parenting Alliance Measure (PAM) measures the strength of alliance primary caregivers have in raising their children (Abidin & Konold, 1999). Mothers responded to 20 statements using a Likert scale ranging from 1 to 5, with 5 indicating the highest level of agreement. Examples of statements include: talking to the other primary caregiver about our child is something I look forward to; the other primary caregiver pays a great deal of attention to the child; the other primary caregiver and I agree on what our child should and should not be permitted to do; I feel close to the other primary caregiver when I see him or her play with the child.

### **Child behavior**

The Achenbach System of Empirically Based Assessment (ASEBA) contains two scales designed to evaluate children's internalizing and externalizing behaviors: the *Child Behavior Checklist 18 months - 5 years* (CBCL 1 ½ - 5) and the *Child Behavior Checklist 6 - 18 years* (CBCL 6 - 18) (Achenbach & Rescorla, 2000). The checklists contain questions pertaining to the child's emotions and behavior in the past six months. Mothers were asked to think about the behavior of a randomly selected focal child and report whether each statement was "very true," "somewhat true," or "not true." The internalizing subscale provides a rating for the extent to which the child has exhibited symptoms of anxiety, depression, or withdrawal. The externalizing subscale provides a rating of the extent to which the child has exhibited symptoms of aggression, hyperactivity, or noncompliance.



### **Financial distress**

A modified version of the Personal Financial Wellness Scale™ (PFW™Scale);(Prawitz, Garman, Sorhaindo, O'Neill, Kim, & Drentea, 2006) was used to measure mothers' perceptions of their financial situation.. Mothers responded to seven questions (i.e., How often do you worry about your financial situation? How often do you find yourself just getting by financially and living paycheck to paycheck? ) using a Likert scale (1=Never, 2 = Occassionally, 3 = Sometimes, 4 = Frequently, 5 = Very frequently). A higher score indicates more financial distress.

### **Medical need**

In RFS, mothers were asked if they postponed medical care, dental care, or medication purchases. In RFSH, mothers were asked if “In the past year, has there been a time when you had a hard time paying for medical care, dental care or medicines.

### **Child health**

Both RFS and RFSH contain questions pertaining to child obesity, child asthma, child diabetes, ear infections, allergies, colds, flu, sinus, seizures, and permanent disability. The mothers in the RFSH study were asked if the focal child had those health problems. In the RFS study, the mother was asked about all children, and in this study we report on the first child. The RFSH questions were recoded to match the RFS questions; no = 0, yes = 1. A sum score was created from these items, with higher scores representing more health problems.

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**CHAPTER 2. MATERNAL DEPRESSIVE SYMPTOMS AND PARENTING  
ALLIANCE AS MEDIATORS BETWEEN HOUSEHOLD FOOD INSECURITY  
AND CHILD BEHAVIOR AMONG RURAL LATINO IMMIGRANT FAMILIES**

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**Abstract**

The Family Stress Model was used to examine the relations between food insecurity, maternal depressive symptoms, parenting alliance, and child behavior. Data from NC 1171, 'Rural Families Speak about Health', were analyzed in an exploratory study using path analysis for 99 rural Latino mothers with low incomes. Results show that maternal depressive symptoms were associated with a decrease in parenting alliance. Implications regarding food insecurity, depression, parenting, and child behavior are discussed.

Household food insecurity is a complex phenomenon that centers on constrained and unpredictable accessibility of, and ability to obtain food (Anderson, 1990). The ability to obtain food is related to economic resources in the household that are used to purchase food, while accessibility is related to all household members having enough safe and nutritional food throughout the year. Several factors including policies, economics, and individual factors related to low income, such as education and employability, increase

this phenomena among immigrant families in the U.S. (Koball, Liu, Morgan, & Clary, 2013; Grieco, et al., 2012).

First measured by the United States Department of Agriculture in 1995, household food insecurity has increased from 10.3 percent of U.S. households in 1995 (Food and Nutrition Service, United States Department of Agriculture, 1999) to 14 percent in 2014 (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2015). Latino households disproportionately experienced higher rates of household food insecurity than the overall US population, with 22.4% of Latino households reporting food insecurity compared to 14% of US households in 2014 (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2015). The disproportionate percentage of Latino households that experience food insecurity and the potential negative ramifications of food insecurity on family functioning pose unique challenges to rural communities that have substantial Latino populations. While Latinos comprise the largest minority group in the U.S. (17%), and account for more than 50 percent of the total U.S. population growth over the past decade (Krogstad, 2014), rural counties and different areas of the U.S. have seen dramatic increases in the Latino population. For example, in the Midwest, the Latino population increased by 49% between 2000 -2010 (Ennis, Rios-Vargas, & Albert, 2011).

Family stress has a negative impact on child behaviors, such as when a family has difficulty regularly accessing enough food (Slopen, Fitzmaurice, Williams, & Gilman, 2010; Fiese, Gundersen, Koester, & Washington, 2011). Internalizing and externalizing behavior problems are associated with household food insecurity (Whitaker, Philips & Orzol, 2006; Perez-Escamilla, & Vianna, 2012). Parenting stress has been shown to be a

mediator between household food insecurity and problem behaviors in children (Huang, Oshima, & Kim, 2010).

In addition to barriers such as larger distances to food and health resources (Garasky, Morton, & Greder, 2006) that rural families may face in meeting basic needs, Latino families residing in rural communities commonly face additional barriers. Low incomes, limited formal education, limited English language proficiency, lack of trained interpreters and culturally competent health care providers commonly present additional challenges for Latino immigrant families in accessing food and health resources (Cristancho, Garces, Peters & Mueller, 2008).

Furthermore, studies have revealed values and beliefs regarding food held by Latino families in the U.S. (Gomel & Zamor, 2007; Greder, de Slowing, & Doudna, 2012). Lack of understanding and appreciation of these values and beliefs can contribute to the creation of barriers to accessing food that Latinos believe are healthful. For example, Gomel and Zamor (2007) found in their study of Latino immigrant families that mothers believed canned, prepackaged and processed foods were not healthy. Greder, de Slowing, and Doudna (2012) found Latino immigrant mothers shared this belief. They also valued feeding their children fresh produce and meat, as well as meals prepared from scratch. Thus, Latino families that have low household incomes may experience household food insecurity differently because their perception about what constitutes healthy food constrains which foods are acceptable.

### **Present investigation**

While there is a dearth of research on rural families, there exists an even greater deficit of research about rural racial ethnic minority families. Previous research utilizing

the FSM with ethnically diverse (African-American and Hispanic), low-income families that have young children, (Mistry, Lowe, Benner & Chien, 2008; Mistry, Vandewater, Huston & McLoyd, 2002), have been based on urban populations. This paucity in research is especially disadvantageous to rural Latino families, since this group is the fastest growing group in rural areas (Kandel & Cromatie, 2004) and rural communities are already underserved, especially in regards to mental health care (Campbell, Gordon & Chandler, 2002).

The present exploratory study proposes to extend aspects of the study of urban ethnic minority families conducted by Slopen, Fitzmaurice, Williams, and Gilman (2010), as well as examine a different population, Latino families who live in small rural communities. In this exploration, we examine both maternal depressive symptoms and alliance between parents (defined by extent of cooperation, communication and mutual respect between parents) as mediators in the relationship between food insecurity and child behavior. Slopen et al. (2010) did not include parenting alliance or parenting behavior in their application of the FSM. Interparental conflict is an important component of the model, and the present study examines its' mediating role between household food insecurity and child behavior. Additionally, Slopen and colleagues (2010) measure of household food insecurity was based on one question, whereas the present study utilized a standardized six-item measure, which is important because it indicates validity and reliability, as well as allows for comparison between studies.

The current exploratory study replicates the FSM (Conger & Conger, 2002) in some aspects. Household food insecurity is conceptualized as separate from financial distress. Parents' emotional state is conceptualized as depressive symptoms in mothers. Instead of

directly measuring interparental conflict or withdrawal, the current study examines the quality of co-parenting between primary caregivers from the perspective of mothers. Parenting behavior and parenting style is omitted from the current study. In a similar fashion to the FSM, child behavior is conceptualized as externalizing and internalizing. Finally, the current study posits direct effects of household food insecurity to child behavior problems, and is theoretically similar to the direct effect from economic pressure to marital problems found in Finland (Kinnunen & Feldt, 2004), Korea (Kwon, Rueter, Lee, Koh & Ok, 2003) and Turkey (Aytac & Rankin, 2009).

In this exploratory study, we hypothesized that higher levels of food insecurity will be associated with higher levels of depressive symptoms in mothers, and higher levels of internalizing and externalizing child behaviors. Additionally, we predicted that the relationship between household food insecurity and child behaviors will be mediated by maternal depressive symptoms and alliance among parents. Furthermore, we tested the model with financial distress (how mothers feel about their financial situation) as a control variable in order to understand the unique contribution of food insecurity to depressive symptoms above and beyond that of financial distress. We test these hypotheses using two groups, mothers with children 1 ½ years old to 5 years old, and mothers with children 6 to 12 years old because there may be differences behavior between the age groups due to developmental processes.

### **Theoretical framework**

The FSM proposes that economic hardship is positively associated with economic pressure, and that both economic hardship and economic pressure are positively related to parent emotional and behavioral problems. These parental problems are related to harsh



and inconsistent parenting, and mediated by interparental conflict. In turn, harsh, inconsistent parenting is hypothesized to have a positive association with child emotional and behavior problems (Conger & Conger, 2002). The primary hypothesis of the extended FSM is that disrupted parenting is the mediator between economic hardship and child problems (Conger, Conger & Martin, 2010). The current study replicates part of the Family Stress Model (FSM)(Conger & Elder, 1994) which proposes that economic hardship increases the risk of negative family functioning, negative parenting and compromised child development and well-being. The current study proposes that food insecurity increases the risk of maternal depressive symptomology; thereby disrupting the alliance between primary caregivers, and thus leading to increased child internalizing and externalizing behavior problems (see Figure 1).

### **Household food insecurity and depression**

Household food insecurity is associated with depressive symptoms among rural mothers (Browder, Greder & Jasper Crase, 2013; Huddleston-Casas, Charnigo & Simmons, 2009; Lent, Petrovi, Swanson, & Olson, 2009). Browder and colleagues (2013) found that rural Latina immigrant mothers whose depressive symptoms were consistently high were more food insecure than those whose depressive symptoms were consistently low. Huddleston-Casas and colleagues (2009) sought to examine the relationship between household food insecurity and depressive symptoms in rural mothers over time. They found the relationship to be reciprocal, indicating a concurrent causal relationship. Lent and colleagues (2009) also examined household food insecurity and depression over time in rural mothers. Depressive symptoms were associated with remaining food insecure over time, and there were mediating mechanisms in this relationship. Specifically, depression

limited the ability for the depressed individual to work, depression in one family member limited the ability of another family member to work, and child depression made it difficult to find childcare. Olson, Anderson, Kiss, Lawrence and Seiling (2004) found maternal depressive symptoms of rural mothers to be a risk factor for household food insecurity.

### **Household food insecurity, depression, parenting and child behavior**

Among urban preschool children, household food insecurity was associated with child behavior problems (Whitaker, Philips & Orzol, 2006). In their review of how household food insecurity affects child development, Perez-Escamilla and Vianna (2012) found strong evidence of household food insecurity as a strong stressor with potential direct and indirect effects on child behavior. Research about the relationship between food insecurity and child behavior has also focused on potential mediators. Huang, Oshima, and Kim (2010) found parenting stress mediated the relationship between food insecurity and child behaviors. However, short-term household food insecurity was not as impactful as family background and parental characteristics on child behaviors. Additionally, mothers of food insecure children were less open to experience, less conscientious, less agreeable, less extraverted and more neurotic (Belsky, Moffit, Arseneault, Melchior, & Caspi, 2010).

Other researchers examined how maternal depression impacts parenting behaviors. Studies reveal that maternal depression leads to an overall reduction in a mother's ability to care for and raise children (Gotlib & Goodman, 1999; Kiernan & Huerta, 2008). For example, depressed mothers may create living environments that are more stressful (Marmorstein, Malone, & Iacono, 2004) or demonstrate more negative and hostile

behaviors toward their children (Downey & Coyne, 1990; Lovejoy, Graczyk, O'Hare, & Neuman, 2000). In their meta-analytic review, Lovejoy and colleagues (2000) found maternal depression to be strongly associated with negative parenting behavior, with a weaker association with disengagement from the child. Although current depression had the largest effects on parenting, past depression had residual effects on parenting as well.

Maternal depression may also place children at risk for internalizing and externalizing behavior problems (Coyne & Thompson, 2011; Goodman, Rouse, Connell, Broth, Hall & Heyward, 2011). A recent meta-analysis reported statistically significant, yet small effect sizes, for relationships between maternal depression and children's internalizing and externalizing behaviors (Goodman et al., 2011). There were some differences in effect sizes due to gender and child age. Future research is needed to explore combinations of risk factors in mothers and children that lead to behavior problems in children of depressed mothers (Goodman et al., 2011).

[Insert Figure 1 about here]

## **Methods**

### **Sample**

Data for this study are drawn from in-person computer assisted interviews conducted between 2010 and 2013 with 444 mothers who lived in a rural community in one of 13 states (California, Hawaii, Illinois, Iowa, Kentucky, Massachusetts, Nebraska, New Hampshire, North Carolina, South Dakota, Tennessee, Texas, and Washington) that participated in *Rural Families Speak about Health* (RFSH) project (Mammen & Sano, 2014). Mothers were 18 years of age or older, had at least one child 12 years of age or

younger, and lived in households with incomes at or below 185% of the federal poverty level. If the mother had more than one child, a focal child was randomly selected. Mothers responded to all child related measures based on the focal child. Nearly all of the mothers lived in rural counties that were designated as having an urban influence code (UIC) ranging from 6-10. The urban influence code classifies U.S. counties into categories according to population size, urbanization, and access to larger communities. Higher UIC values indicate greater rurality (ERS, USDA, 2007).

The current study analyzed data from Wave 1 of a sub-sample from RFSH comprised of 99 Latina mothers who resided in California, Hawaii, Iowa, Massachusetts, North Carolina, Nebraska, Tennessee or Washington. Mothers whose randomly selected focal child was under 18 months of age ( $n = 10$ ) were excluded from the study because the measure that assessed child behaviors used in the study (i.e., Child Behavior Checklist, Achenbach & Rescorla, 2000) contained items relevant to children older than 18 months of age.

## **Recruitment**

Mixed Purposive Sampling (MPS) (Mammen & Sano, 2012), a nonprobability sampling method that combines strengths of both purposive sampling and chain-referral sampling, was employed to recruit participants for RFSH. Once recruited, participants were interviewed in person in their homes or in a private conference room in a public building. The research team in each state identified a person to serve as the interviewer. Interviewers were either graduate students, faculty members, University Cooperative Extension specialists, or a family-serving professional who received training in interview techniques. The interviewer read the questions and typed participants' responses onto a

computer template. The interview protocol included demographic questions, and questions from standardized instruments pertaining to the physical and mental health of mothers and children. In each household, a focal child was randomly selected and mothers responded to questions about children with this child's information. Participants were offered gift cards after completing the interview process. Based on the preference of the mothers, interviews were conducted in English or Spanish.

## **Measures**

**Household food insecurity (predictor variable).** Household food insecurity was measured using the Six-Item Short Form of the USDA Household Food Security Module and the associated Six-Item Food Security Scale (Bickel, Nord, Price, Hamilton, & Cook, 2000). Household food security scores were based on the number of affirmative responses questions such as: 1) "In the last 12 months, the food that (I/we) bought just didn't last, and (I/we) didn't have money to get more." Response options included often true, sometimes true, never true, don't know or refused, with often true and sometimes true considered affirmative responses; and 2) "In the last 12 months, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?". Affirmative responses were coded with a score of one, with higher scores indicating higher levels of household food insecurity. The Chronbach's alpha for the sample was .75 ( $n = 99$ ).

**Maternal depression (mediating variable).** Symptoms for depression among mothers was measured using a shortened form (Andresen, Malmgren, Carter, & Patrick, 1994) of the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). Mothers reported how often they felt or behaved in the last two weeks in response

to ten statements such as I had trouble keeping my mind on what I was doing and I felt that everything I did was an effort. Responses options included: rarely or none of the time (less than 1 day = 0), some or a little of the time (1 - 2 days = 1), occasionally or a moderate amount of time (3 - 4 days = 2), and all of the time (5 - 7 days = 3). Responses were summed and total scores ranged between 0 – 30. A score of 10 or higher indicates clinically significant depressive symptomology. The Chronbach's alpha for this sample is .74 (n = 98).

**Parenting alliance (mediating variable).** The Parenting Alliance Measure (PAM) measures the strength of alliance between primary caregivers in raising their children (Abidin & Konold, 1999). Mothers responded to 20 statements using a Likert scale ranging from 1 to 5, with 5 indicating the highest level of agreement. Examples of statements include: talking to the other primary caregiver about our child is something I look forward to; the other primary caregiver pays a great deal of attention to the child; the other primary caregiver and I agree on what our child should and should not be permitted to do; I feel close to the other primary caregiver when I see him or her play with the child. The Chronbach's alpha for this sample is .91 (n = 81).

**Child behavior (outcome variable).** The Achenbach System of Empirically Based Assessment (ASEBA) contains two scales designed to evaluate children's internalizing and externalizing behaviors: the *Child Behavior Checklist 18 months - 5 years* (CBCL 1 ½ - 5) and the *Child Behavior Checklist 6 - 18 years* (CBCL 6 - 18) (Achenbach & Rescorla, 2000). The checklists contain questions pertaining to the child's emotions and behavior in the past six months. Mothers were asked to think about the behavior of a randomly selected focal child and report whether each statement was "0 =

not true,” “1 = somewhat or sometimes true,” or “0 = very true or often true”. The internalizing subscale provides a rating for the extent to which the child has exhibited symptoms of anxiety, depression, or withdrawal. The externalizing subscale provides a rating of the extent to which the child has exhibited symptoms of aggression, hyperactivity, or noncompliance. Because this measure is a checklist, the reliability measure of Chronbach’s alpha is not applicable.

**Financial distress (control variable).** A modified version of the Personal Financial Wellness Scale™ (PFW™Scale);(Prawitz, Garman, Sorhaindo, O’Neill, Kim, & Drentea, 2006) will be used to measure mothers’ perceptions of their financial situation.. Mothers responded to seven questions (i.e., How often do you worry about your financial situation? How often do you find yourself just getting by financially and living paycheck to paycheck? ) using a Likert scale (1=Never, 2 = Occassionally, 3 = Sometimes, 4 = Frequently, 5 = Very frequently). A higher score indicates more financial distress. The Chronbach’s alpha for this sample is .73 (n = 98).

## **Analysis**

Descriptive statistics and correlations of all study variables and demographics were calculated using SPSS. Our conceptual model examined relations between household food insecurity, mothers’ depressive symptoms, parenting alliance, and internalizing and externalizing child behaviors, while controlling for financial distress. The model detailed in Figure 1 was analyzed in Mplus as a two-group model using bias controlled bootstrap iterations and maximum likelihood estimation. To test for indirect effects, 1,000 bias corrected bootstrap iterations were performed. Bootstrapping procedure guards against a non-normal distribution of the mediating effect (Shrout & Bolger, 2002) and the risk of

spuriousness. The groups are based on the age ranges defined in the Child Behavior Checklist. The younger group is comprised of target children age 18 months to 71 months, while the older group is comprised of target children 72 months to 155 months. Financial distress was controlled for by entering it into the model first. To test for the mediating effect of depressive symptoms and parenting alliance, indirect effects were tested, as well as 95% confidence intervals for the specific indirect effects.

### **Results**

Demographics are displayed in Tables 1 and 2. The demographics for the sample as a whole (Table 1) and the sample divided by child age groups are provided (Table 2).

[Insert Tables 1 and 2 about here]

Descriptives are displayed in Tables 3 and 4. The descriptives for study variables are provided for the whole sample and the sample divided by child age. For the whole sample, 29.3% of the households were identified as food insecure ( $n = 29$ ). 17% of mothers were at or above the cut-score (10) for depressive symptomology ( $n = 17$ ). For the whole sample, the average parenting alliance score was 91.71 ( $SD = 10.85$ ), for older 91.66 ( $SD = 11.95$ ) and younger 91.76 ( $SD = 9.91$ ). For the whole sample, the average financial distress score was 24.70 ( $SD = 3.57$ ), for older 25.10 ( $SD = 3.14$ ) and younger 24.36 ( $SD = 3.90$ ). For internalizing behaviors, the mean of the sum scores for younger children was 7.99 ( $SD = 6.71$ ) and for older children 7.67 ( $SD = 5.36$ ). For externalizing behaviors, the mean of the sum scores for younger children was 11.60 ( $SD = 8.99$ ) and for older children 8.10 ( $SD = 7.58$ ).

[Insert Table 3 and 4 about here]



Correlations of study variables are found in Table 5 and 6. Correlations for the study sample as a whole, as well as divided by child age are provided. For the sample as a whole, internalizing and externalizing behaviors of children in the younger group as well as the older group were significantly correlated ( $r = .84, p < .01$ ;  $r = .37, p < .05$ ). Additionally, depressive symptoms was significantly correlated with parenting alliance and financial distress ( $r = -.32, p < .01$ ;  $r = .27, p < .01$ ). As detailed in Table 6, for children in the older group, parenting alliance was negatively correlated with depressive symptoms ( $r = -.34, p < .05$ ). Household food insecurity was negatively correlated with externalizing behaviors for this group as well ( $r = -.31, p < .05$ ). For children in the younger group, depressive symptoms was negatively correlated with parenting alliance ( $r = -.30, p < .05$ ).

[Insert Table 5 and 6 about here]

The model fit the data in an acceptable manner. The  $\chi^2(8) = 10.80, p < .21$ . The comparative fit index (CFI) was .95, the Tucker Lewis Index (TLI) was .82, and the root mean square error of approximation (RMSEA) was .08 with a 90% CI [.000, .20]. The model results are detailed in Table 7. While none of the parameter estimates were significant for the younger age group, the association between maternal depressive symptoms and parenting alliance trended toward significance ( $\beta = -.27, p = .12$ ). For the older age group, depressive symptoms was significantly related to parenting alliance ( $\beta = -.41, p = .007$ ). Additionally, among the older child group, the association between household food insecurity and parenting alliance ( $\beta = .20, p = .12$ ), and the association between household food insecurity and externalizing behavior ( $\beta = .33, p = .15$ ) trended toward significance. Due to only one significant result, the change in the chi-square value

between models with individual pathways constrained and a baseline model in which all pathways were unconstrained was not examined to determine if any paths varied significantly between younger and older children.

[Insert Table 7 about here]

## **Discussion**

Rural Latina mothers commonly experience many stressors, including those of household food insecurity and depressive symptoms that can affect child behavior (Whitaker, Philips & Orzol, 2006; Perez-Escamilla and Vianna, 2012; Coyne & Thompson, 2011; Goodman, Rouse, Connell, Broth, Hall & Heyward, 2011). The degree of alliance between primary caregivers is important to examine when looking at child behavior outcomes. The Family Stress Model (Conger & Elder, 1994) is an appropriate framework to apply to this study because the stressor of household food insecurity is examined while controlling for financial distress. Maternal depressive symptoms and parenting alliance were examined as potential mediators between household food insecurity and child behavior.

The purpose of this exploratory study was to determine if maternal depressive symptoms and parenting alliance served as mediators in the relationship between household food insecurity and child internalizing and externalizing behaviors. While these two variables did not serve as mediators in the relationship, an increase in maternal depressive symptoms was significantly related to a decrease in parenting alliance among mothers who had older children (6 to 12 years old), while controlling for financial distress. Additionally, among mothers who had older children, there were two associations that trended toward significance. First, the association between household food insecurity and

parenting alliance trended toward significance, showing the possibility that an increase in household food insecurity was associated with an increase in parenting alliance, while controlling for financial distress. While the direction of this association may seem contrary to expectations, it is possible that mothers experiencing increased food insecurity form a stronger alliance with their co-parent/caregiver to protect against the stress of household food insecurity. It may be that when facing the stressor of household food insecurity, levels of cohesion increase between the primary caregivers, creating a stronger alliance (Olson, 2000). The second association with a trend toward significance was between household food insecurity and child externalizing behavior. This possible association is consistent with the literature (Whitaker, Philips & Orzol, 2006; Slopen, Fitzmaurice, Williams, & Gilman, 2010; Perez-Escamilla & Vianna, 2012). While this direct relation is not explained by mechanisms related to family processes, it may be more physiological in nature, with the physical consequences of household food insecurity directly increasing externalizing behaviors among children. While none of the associations for the group of younger children were significant, one did trend toward significance. Similar to the significant association for the group of older children, there was a trend that showed the possibility that an increase in maternal depressive symptoms was related to a decrease in parenting alliance. Maternal depressive symptoms are a stressor that reduces cooperation between parents and this is reflected in lower levels of parenting alliance.

While acknowledging that trends toward significance are indeed not significant, it is interesting to note the possibility that household food insecurity and depressive symptoms are stressors that affect parenting alliance in opposite ways. While commonly

one would expect stressors to have a negative association with parenting alliance, in this study, only depressive symptoms had this association.

### **Limitations and strengths**

While this study contributes to the study of rural Latina mothers, there are limitations as well. In order to gain access to a population containing potential undocumented people, a nonprobability sample was used. Although this makes the study population non-representative of the rural Latina population as a whole and limits generalizability, it allows researchers to learn more about a population that is difficult to access. Next, the study design is based on self-reported data from mothers, which introduces bias due to social desirability. Additionally, each construct is measured only by one scale, which reduces convergent validity. Another limitation related to measures is that we did not measure inconsistent or harsh parenting, which is a part of the FSM. The data are cross sectional and no causal or predictive claims can be suggested. Finally, the sample size was small, which increases the likelihood of Type II error, that is, there may have been more significant results but the power to detect significant associations was limited by the sample size. Future studies should consider a random sampling strategy, the inclusion of viewpoints of other family members, the inclusion of observational data, measurement of constructs in multiple ways, longitudinal design, and an increased sample size. However, despite these limitations, the study contributes to the literature by including parenting alliance in an application of the FSM and examining a seldom studied population of rural Latino families. This exploratory study has strengths. A seldom studied population is examined within the framework of the well-known and extensively tested Family Stress Model (Conger & Elder, 1994), using measures that are reliable and valid,

and financial distress is controlled for in an attempt to isolate household food insecurity as a stressor separate from financial distress.

## **Conclusions**

In this study, it was clear that an increase in depressive symptoms was associated with a decrease in parenting alliance among rural Latina mothers who had children six to 12 years of age. Professionals, such as couple and family therapists and family life educators can work together to assess the stressors faced by families of rural Latina mothers, with a particular focus on depressive symptoms and on how well primary caregivers operate as a team. These can be measured easily during an office visit with a mental health professional.

As with all families, it is important that rural Latino families have access to resources that can positively benefit them and their families so they can interact in an optimal manner. In order for primary caregivers to have a strong alliance, the opportunity to gain or maintain positive mental health is important. Positive mental health could be promoted, and depressive symptoms decreased, through increased access to mental health resources that are culturally relevant and professionals who are prepared to provide services to a predominantly Spanish speaking population. Another potential mode of accessing resources to promote positive mental health is telehealth, a method to deliver mental health services for people in rural areas (Brownlee, Graham, Doucette, Hotson, & Halverson, 2010). Telehealth has been shown to reduce depressive symptoms for rural, Mandarin-speaking immigrants who received treatment from a Mandarin-speaking therapist (Zheng & Gray, 2014). To increase opportunities for positive impact on mental health, it is important for these strategies to be enacted simultaneously and be specifically

tailored to specific population groups of Latino immigrants. Increased access and use of mental health services may decrease depressive symptoms, and thereby increase alliance between primary caregivers as they care for their children.

Future research should further examine the role parenting alliance plays in applications of the FSM among rural Latina mothers. Parenting alliance may be affected negatively or positively depending on the type of stressor. Household stressors such as food insecurity may operate differently than depressive symptoms in their impact on parenting alliance. Findings from this study suggested that the association between household food insecurity and parenting alliance should be further explored, including examining potential mechanisms that mediate the relationship.

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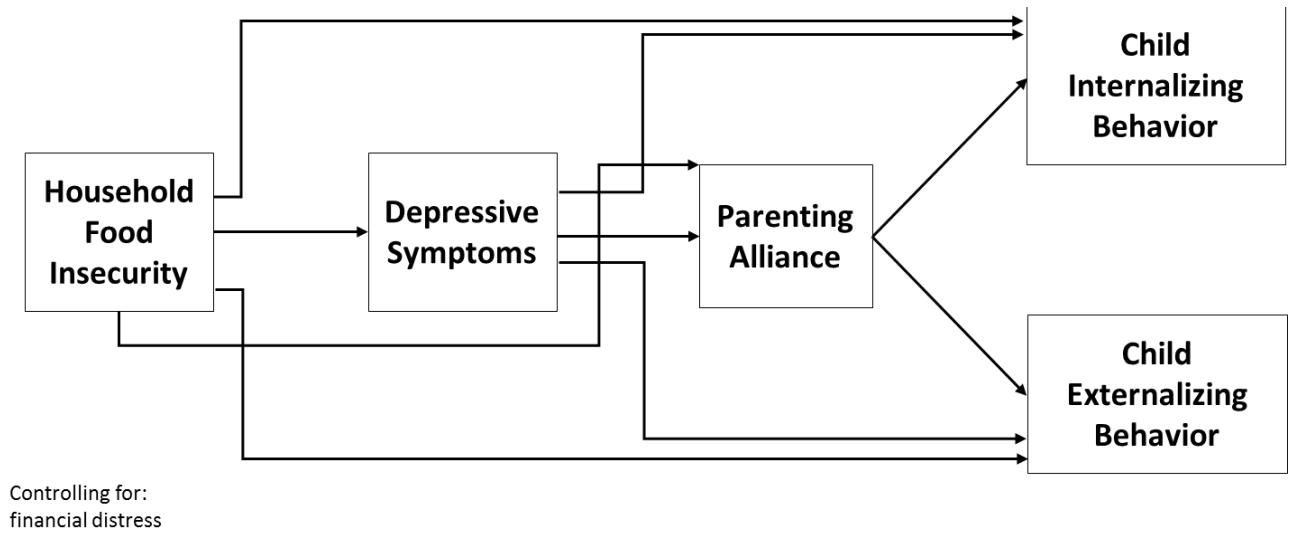


Figure 1

*Proposed Model*



Table 1

*Demographics for the Total Sample n = 99*

Variable	Mean	SE	SD	N, %	Median
Child's age (months)	73.57	3.92	38.99		66
Child gender					
Boy				55, 55.6	
Girl				44, 44.4	
Mothers' employment status					
Employed				29, 29.3	
Unemployed				70, 70.7	
Mothers' age (years)	32.36	.793	7.87		
Mothers' education level					
8th grade or less				24, 24.2	
Some high school				23, 23.2	
High school				23, 23.2	
GED				8, 8.1	
Specialized technical, business or vocational training				6, 6.1	
Some college including AA				11, 11.1	
Bachelors degree				4, 4	
Family structure					
Single, never married, not cohabiting				3, 3	
Currently single (previously divorced or widowed)				4, 4	
Married				61, 61.6	
In a civil union				5, 5.1	
In a domestic partnership				7, 7.1	
In a cohabiting relationship (i. e. living together)				15, 15.2	
Other-Please specify				4, 4	
Total household income					\$25,000 - \$29,999

Table 2

*Demographics by Child Age: Older: 6 -12 years old (Younger: 1 ½ - 5 years old)*

Variable	Mean	SE	SD	N, %	Median
Child's age in months	109.54 (42.34)	3.47 (2.15)	23.55 (15.68)		109.50 (39)
Child gender					
Boy				26, 56.5 (29, 54.7)	
Girl				20, 43.5 (24, 45.3)	
Mothers' employment status					
Employed				13, 28.3 (16, 30.2)	
Unemployed				33, 71.7 (37, 69.8)	
Mothers' age in years	36.04 (29.17)	1.10 (.96)	7.25 (7.02)		36 (28)
Mothers' education level					
8th grade or less				16, 34.8 (8, 15.1)	
Some high school				8, 17.4 (15, 28.3)	
High school				11, 23.9 (12, 22.6)	
GED				3, 6.5 (5, 9.4)	
Technical, business or vocational training				3, 6.5 (3, 5.7)	
Some college				3, 6.5 (8, 15.1)	
Bachelors degree				2, 4.3 (2, 3.8)	
Family structure					
Single				1, 2.2 (2, 3.8)	
Divorced or widowed				2, 4.3 (2, 3.8)	
Married				32, 69.6 (29, 54.7)	
Civil union				1, 2.2 (4, 7.5)	
Domestic partnership				2, 4.3 (5, 9.4)	
Cohabiting relationship				7, 15.2 (8, 15.1)	
Other				1, 2.2 (3, 5.7)	
Total household income					\$25,000 - \$29,999 (\$20,000 - \$24,999)

Table 3

*Descriptive Statistics of the Study Variables for the Total Sample n = 99*

Variable	M	SD	n
Younger internalizing	7.99	6.71	38
Younger externalizing	11.60	8.99	37
Older internalizing	7.67	5.36	42
Older externalizing	8.10	7.58	42
CESD	5.76	4.85	99
Parenting Alliance	91.71	10.85	99
Financial distress	24.70	3.57	99
Household food insecurity	1.04	1.50	99

Table 4

*Descriptives by child age: Older: 6 -12 years old (Younger: 1 ½ - 5 years old)*

Variable	M	SD	n
CESD	5.93 (5.60)	4.97 (4.78)	46 (53)
Parenting Alliance	91.66 (91.76)	11.95 (9.91)	46 (53)
Financial distress	25.10 (24.36)	3.14 (3.90)	46 (53)
Household food insecurity	1.11 (.98)	1.34 (1.59)	46 (53)

Table 5

*Correlations of study variables total sample n = 99*

Variables	1	2	3	4	5	6	7	8
1. Younger internalizing Behavior	1	----	----	----	----	----	----	----
2. Younger externalizing behavior	.84**	1	----	----	----	----	----	----
3. Older internalizing behavior	.b	.b	1	----	----	----	----	----
4. Older externalizing behavior	.b	.b	.37*	1	----	----	----	----
5. Depressive symptoms	.16	.20	.01	.18	1	----	----	----
6. Parenting alliance	-.06	-.10	.06	-.20	-.32**	1	----	----
7. Financial distress	.07	.16	.20	.07	.27**	-.01	1	----
8. Household food insecurity	.06	.20	.01	.31*	.14	.06	.16	1

\*\*. Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

.b cannot be computed because at least one of the variables is constant.

Table 6

*Correlations of Study Variables for Older Group of Children (above the diagonal) and Younger Group of Children (below the diagonal)*

	1	2	3	4	5	6
1. Internalizing behavior	1	.37*	.01	.06	.20	.01
2. Externalizing behavior	.84**	1	.18	-.20	.07	.31*
3. Depressive symptoms	.16	.20	1	-.34*	.27	.20
4. Parenting alliance	-.06	-.10	-.30*	1	-.06	.13
5. Financial distress	.07	.16	.27	.03	1	.18
6. Household food security	.06	.20	.09	.01	.14	1

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

Table 7

*Unstandardized, Standardized, and Significance Levels for Model (Standard Errors in Parentheses; N = 99)*

<i>Parameter Estimate Older group</i>	<i>Unstandardized</i>	<i>Standardized</i>	<i>p</i>
Household food insecurity → Depressive symptoms	.87 (.66)	.23	.19
Household food insecurity → Parenting alliance	1.73 (1.12)	.20	.12
Household food insecurity → Internalizing behavior	-.06 (.70)	-.02	.93
Household food insecurity → Externalizing behavior	1.87 (1.29)	.33	.15
Depressive symptoms → Parenting alliance	-.96 (.35)	-.41	.007
Depressive symptoms → Internalizing behavior	.07 (.22)	.07	.731
Depressive symptoms → Externalizing behavior	.07 (.30)	.04	.825
Parenting alliance → Internalizing behavior	.05 (.06)	.11	.396
Parenting alliance → Externalizing behavior	-.15 (.13)	-.22	.249
<i>Parameter Estimate Younger group</i>			
Household food insecurity → Depressive symptoms	.18 (.44)	.06	.68
Household food insecurity → Parenting alliance	.29 (.88)	.05	.75
Household food insecurity → Internalizing behavior	.08 (.67)	.02	.90
Household food insecurity → Externalizing behavior	.81 (.85)	.15	.34
Depressive symptoms → Parenting alliance	-.57 (.36)	-.27	.12
Depressive symptoms → Internalizing behavior	.17 (.28)	.12	.55
Depressive symptoms → Externalizing behavior	.28 (.34)	.15	.41
Parenting alliance → Internalizing behavior	.01 (.09)	.02	.87
Parenting alliance → Externalizing behavior	-.02 (.12)	-.02	.88
<i>Note: <math>\chi^2(8) = 10.80, p = .21</math>; CFI = .95; TLI = 0.82; RMSEA = .08</i>			

### **CHAPTER 3. MATERNAL DEPRESSIVE SYMPTOMS AS A MEDIATOR BETWEEN MATERIAL HARDSHIPS AND CHILD HEALTH**

A paper to be submitted to *The Journal of Rural Health*

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#### **Abstract**

The Family Stress Model was used to examine the relations between material hardships, child health, and maternal depressive symptoms as a mediator. Data from two separate but related datasets were analyzed using path analysis (Rural Families Speak,  $n = 119$ ; and Rural Families Speak about Health,  $n = 136$ ). Results show that household food insecurity is positively associated with maternal depressive symptoms, and that depressive symptoms are negatively associated with child health. Maternal depressive symptoms were found to have an indirect, mediating effect between household food insecurity and child health. Implications regarding household food insecurity, depression, and child health are discussed.

Child health is influenced by a number of factors, including family income, health care access, insurance, behavior, and culture (Hughes & Ng, 2003). These factors are social determinants of health. The Commission on Social Determinants of Health defines the social determinants of health as the conditions into which a person is born and develops over time (Commission on Social Determinants of Health, 2008). Social determinants of health are drivers behind health disparities among racial and ethnic groups, individuals of various socioeconomic levels, and gender.

#### **Health among Latino children**

Latino children in the United States experience health disparities. When compared to non-Latino White children born in the United States, Latino children regardless of

immigration family type had higher odds of obesity, and poor physical and dental health (Yu, Lin & Adirim, 2013). Additionally, Latino children face greater odds of hospitalization and death due to injuries (Agran, Winn, Anderson, & Del Valle, 1998), less than optimal health status, (Flores, Bauchner, Feinstein & Nguyen, 1999) and a decreased likelihood of receiving the following: vision screening, prescriptions, adequate pain medication, and high quality care for asthma and gastroenteritis (Flores, Abreu, Olivar, & Kastner, 1998).

The current study will extend the Family Stress Model to include child health and examine two unique populations of rural Latina mothers to examine differences before and after the Great Recession. Rural Latina mothers prior to the Great Recession may have experienced material hardship and depressive symptoms differently than rural Latina mothers after the Great Recession, thus leading to differences in child health.

Health risks faced by Latino children pose unique challenges to rural communities, as the Latino population increased by 49% between 2000 -2010 in the Midwest (Ennis, Rios-Vargas, & Albert, 2011). In addition to barriers experienced by many rural residents, such as increased distance to food and health resources (Garasky, Morton & Greder, 2006), Latino families commonly face additional barriers such as limited English language proficiency. For example, in some rural communities, language barriers can be part of the challenge for Latinos in accessing health resources (Cristancho, Garces, Peters & Mueller, 2008).

To help inform policy, knowing which stressors are more detrimental for rural Latino families is essential. Low income rural Latino families who are experiencing material hardship and/or maternal depression need culturally sensitive prevention and



intervention programs. These efforts in turn, have the potential to reduce health problems in children.

### **Present investigation**

There is a dearth of research about rural families from racial or ethnic minority groups. While the FSM have been tested with ethnically diverse, low-income families with young children, (Mistry, Lowe, Benner & Chien, 2008; Mistry, Vandewater, Huston & McLoyd, 2002), most families lived in urban areas. This gap in research is especially detrimental to rural Latino families, since they are the fastest growing group in rural areas (Kandel & Cromatie, 2004) and rural communities already are underserved in the area of health (U.S. Government Accountability Office).

This study proposes to extend the FSM in two ways. First, unique aspects of material hardship, specifically household food insecurity and medical need, will be examined, as these constructs may have strong associations with child health. Second, child well-being is conceptualized as child health. This extension allows for a unique set of variables to be examined among rural Latino families.

It is expected that higher levels of food insecurity and medical need will be associated with higher levels of depressive symptoms in mothers, and higher levels of health problems in children. The relationship between the material hardships of food insecurity and medical need and child health problems will be mediated by maternal depressive symptoms. Direct, positive associations between the material hardship variables and child health problems are also expected.

In addition, the model will be tested with mother's education level, mother's age, and child's age as controls. The demographic variable of mothers' education level is related to socioeconomic status, a potential confounder even though the sample is all low-income. Mothers' age and age of child is used as a control because age could be a possible confounder, as age could explain the associations among variables.

### **Theoretical framework**

The current study extends the Family Stress Model (FSM) which (Conger & Elder, 1994) suggests that economic hardship increases the risk of negative family functioning, negative parenting and child well-being. While the FSM first hypothesized how socioeconomic status affected romantic relationships between adults (Conger & Conger, 2002), it was later extended to hypothesize how socioeconomic status impacts parenting and child development (Conger & Conger, 2002). In their extension of the FSM, Conger and Conger suggest that economic hardship is positively associated with economic pressure, and that both economic hardship and economic pressure are positively related to emotional and behavioral problems in parents. These problems in parents are associated with harsh and inconsistent parenting, and mediated by conflict between parents. In turn, harsh, inconsistent parenting is theorized to have a positive association with emotional and behavior problems in children (Conger & Conger, 2002). The current study proposes that material hardship, in the forms of household food insecurity and medical need, increases the risk of maternal depressive symptomology, thus leading to increased child health problems (see Figure 1).

## **Material hardship**

**Household food insecurity.** Household food insecurity is a type of material hardship that occurs “whenever the availability of nutritionally adequate and safe food or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain” (Anderson, 1990, p. 1560). Household food insecurity has increased from 10.3 percent of U.S. households in 1995 (Food and Nutrition Service, United States Department of Agriculture, 1999) to 14.3 percent in 2013 (Coleman-Jensen, Gregory, & Singh, 2014). In 2013, 23.7% of Latino households reported food insecurity, which represents a disproportionately higher rate (Coleman-Jensen et al., 2014).

**Medical need.** Medical need is a type of material hardship that can include the postponement of medical treatment, postponement of buying medicines, and low health care usage (Ashiabi & O’Neal, 2007). Of Latino children with U.S.-born parents, 12 percent lacked health insurance in 2010, while 19 percent of Latino children with immigrant parents lacked health insurance that same year (Hernandez & Napierala, 2013). Heflin, London and Scott (2011) found that while the women they interviewed in a qualitative study reported having health insurance through Temporary Aid to Needy Families was helpful, they still had unmet medical needs related to bills and over-the-counter medication. These women also expressed concern over losing their medical benefits in the future.

## **Material hardship and depression**

**Household food insecurity and depression.** Among rural mothers, household food insecurity is associated with depressive symptoms (Browder, Greder & Jasper Crase, 2013; Huddleston-Casas, Charnigo & Simmons, 2009; Lent, Petrovi, Swanson, & Olson,

2009). Rural Latina immigrant mothers with consistently high depressive symptoms were more food insecure than those with consistently low depressive symptoms (Browder, et al., 2013). In an examination of the relationship between household food insecurity and depressive symptoms in rural mothers over time, the relationship was found to be reciprocal, indicating a concurrent causal relationship (Huddleston-Casas, et al., 2009). In another longitudinal study of rural mothers, depressive symptoms were associated with remaining food insecure over time (Lent, et al., 2009)

**Medical need and depression.** Little is known about medical need as a specific type of material hardship and its association with depression, since much of the research combines diverse types of hardship into one variable (Ashiabi & O’Neal, 2007). Ashiabi and O’Neal (2007) found that medical need was related to depression. Additionally, lack of medical care was positively associated with an increased risk of depression among fragile families (parents who are not married) (Heflin & Iceland, 2009).

### **Material hardship, depression, and child health**

Although children in the U.S. who experience food insecurity are less likely to experience stunted growth and wasting as in other countries, the health related implications are substantial. Risks to health due to household food insecurity can begin prenatally, and include associations with birth defects (Carmichael, Yang, Herring, Abrams, & Shaw, 2007). Iron deficiency with anemia is twice as likely to occur in food insecure children under age three, than food secure children (Skalicky et al., 2006). Food insecure preschoolers are more likely to have lower parental ratings of health and be hospitalized for health problems (Cook et al., 2004). Further, the risk of lower parental ratings of health is higher for children of recent immigrants and highest for newly arrived

immigrants (Chilton et al., 2009). Ryu and Bartfeld (2012) found that persistent household food insecurity was associated with increased odds of lower child health status, and they also found that parents' depression was associated with increased odds of lower child health status.

Propper, Rigg and Burgess (2007) found that the association between income and health diminished when controlling for maternal mental health. The material hardship of medical need was found to have an indirect effect on child health through parental depression, and parental depression was also associated with child health (Ashiabi & O'Neal, 2007), whereas parental depression was found to mediate the relationship between food insecurity and physical health among toddlers (Tinkew, Zaslow, Capps, Horowitz, & McNamara, 2007). Caserta et al. (2008) found psychiatric symptoms in parents were related to a higher frequency of total illnesses over a year, and specifically a higher frequency of febrile illnesses.

## **Methods**

### **Participants**

Data examined in this study are from two different, yet related studies that focused on rural low-income mothers and their families. The first project, Rural Families Speak (RFS), was a multi-state longitudinal study of rural low-income families focusing on the well-being of rural families in the context of the 1996 federal welfare reform (Bauer, 2004; Bauer & Katras, 2007). To participate in the study, mothers had to be at least 18 years of age, have a child age 12 or under, and lived in a household at or below 200% of the federal poverty line. Additionally, mothers live in counties considered rural, with populations ranging from 2,500 to 19,999. This study analyzed data from Wave 1 of a

sub-sample from RFS comprised of 119 Latina mothers from California, Michigan, Oregon and Iowa.

The second project, Rural Families Speak about Health (RFSH), includes data from 444 mothers using in-person computer assisted interviews. Mothers lived in rural communities across 13 states (California, Hawaii, Illinois, Iowa, Kentucky, Massachusetts, Nebraska, New Hampshire, North Carolina, South Dakota, Tennessee, Texas, and Washington) (<http://www.ruralfamiliespeak.org/rfsh.html>). To participate in the study, mothers had to be 18 years of age or older, had at least one child 12 years or younger, and lived in households with incomes at or below 185% of the federal poverty level. The majority of mothers lived in rural counties that were designated as having an urban influence code (UIC) ranging from 6-10. The UIC classifies U.S. counties into categories according to population size, urbanization, and access to larger communities. The more rural a county is, the higher the UIC value (United States Department of Agriculture, n.d). The current study analyzed data from Wave 1 of a sub-sample from RFSH comprised of 136 Latina mothers from California, Hawaii, Iowa, Massachusetts, North Carolina, Nebraska, Tennessee, and Washington.

### **Procedure for Rural Families Speak**

Purposive sampling, a type of non-random sampling, was used to recruit mothers to participate in RFSH. Community-based family serving professionals (e.g., Cooperative Extension educators, Head Start teachers) recruited mothers in person and by phone for the study. Mothers were interviewed in-person in their homes or in a private conference at an organization in the community such as a library or Cooperative Extension office (Bauer, 2004; Bauer & Katras, 2007).

### **Procedure for Rural Families Speak about Health**

A nonprobability sampling method called Mixed Purposive Sampling (MPS) (Mammen & Sano, 2012) was used to recruit mothers to participate in RFSH (Mammen & Sano, 2014). MPS combines strengths from both purposive sampling and chain-referral sampling. Mothers were interviewed in person in their homes or in a private room in a public building. Interviewers received training in interview techniques and were either faculty members, University Cooperative Extension specialists, a family-serving professional or graduate students. The interviewer read the questions and typed participants' answers onto a computer template. The interview protocol contained demographic questions, and questions from standardized instruments related to the physical and mental health of mothers and children. For each household, a focal child was randomly designated and mothers answered questions about that child's health and behaviors. Mothers were offered gift cards to recognize their time and expertise shared during the interview. Mothers indicated whether or not they wanted to complete the interview in English or Spanish.

### **Measures**

**Household food insecurity (independent variable).** In RFS, household food insecurity was measured by the 18-item U.S. Household Food Security Module with a 12-month reference period (Hamilton et al., 1997). However, only the six items corresponding to the Six-Item Short Form of the USDA Household Food Security Module were used in this study. The Cronbach's alpha for the corresponding items was .68 ( $n = 60$ ). Household food insecurity was measured in RFSH by asking the mothers questions in the Six-Item Short Form of the USDA Household Food Security Module and the

associated Six-Item Food Security Scale (Bickel, Nord, Price, Hamilton, & Cook, 2000). The Chronbach's alpha was .72 ( $n = 135$ ).

**Medical need (independent variable).** In RFS, mothers were asked in three separate questions about if they postponed medical care, dental care, or medication purchases. In RFSH, mothers were asked if “In the past year, has there been a time when you had a hard time paying for medical care?”, “In the past year, has there been a time when you had a hard time paying for dental care?” and “In the past year, has there been a time when you had a hard time paying for medicines?”. Affirmative answers were coded as 1, and negative answers as 0. Scores were summed, with higher scores indicating more medical need.

**Maternal depression (mediating variable).** In RFS, depressive symptoms were measured by the CES-D, a 20-item instrument used to capture the level of depressive symptoms during the previous week (Radloff, 1977). However, only the ten items corresponding to the CES-D 10 were used in the study. In this sample, the Chronbach's alpha for the 10 corresponding items was .71 ( $n = 108$ ). In RFSH, symptoms for depression in mothers was measured using the short form (CES-D 10) (Andresen, Malmgren, Carter, & Patrick, 1994) of the 20-item Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977). Mothers indicated how often they have felt or behaved in response to ten statements (i.e., I was bothered by things that usually don't bother me; I had trouble keeping my mind on what I was doing; I felt that everything I did was an effort). Responses options include: rarely or none of the time (less than 1 day = 0), some or a little of the time (1-2 days = 1), occasionally or a moderate amount of time (3-4 days = 2), and all of the time (5-7 days = 3). The Chronbach's alpha was .76 ( $n = 135$ ).



**Child health (outcome variable).** Both RFS and RFSH contain questions pertaining to child obesity, child asthma, child diabetes, ear infections, allergies, colds, flu, sinus, seizures, and permanent disability. The mothers in the RFSH study were asked if the focal child had those health problems. In the RFS study, the mother was asked about all children, and in this study we report on the first child. Affirmative answers were coded as 1, and negative answers as 0, and scores ranged from 0 to 10. A sum score was created from these items, with higher scores representing more health problems.

**Mothers' education level (control variable).** RFS participants chose one of eight answer options that ranged from "Eighth grade or less" to "Graduate degree". RFSH participants were asked "What is the highest grade or year of school you have completed?" and were given nine answer options that ranged from "Eighth grade or less" to "Graduate degree".

**Mothers' age (control variable).** In RFS and RFSH, mothers were asked "How old are you?" to determine their age.

**Children's age (control variable).** For the RFS group, child age was recorded for all children who lived in the household 50 percent or more of the time. This study reports on the first child. For the RFSH group, age of focal child was calculated by asking mothers for the date of birth of their focal child and then using the date of the interview to determine child age.

## **Analysis**

Descriptive statistics and correlations of all study variables and demographics were calculated using SPSS. Our conceptual model examined relations between household food insecurity, medical need, mothers' depressive symptoms, and child health, while

controlling for mothers' education level, age, and child age. The model detailed in Figure 1 was analyzed separately for RFS data and RFSH data in Mplus using bias controlled bootstrap iterations and maximum likelihood estimation. To test for indirect effects, 1,000 bias corrected bootstrap iterations were performed. The bootstrapping procedure guards against a non-normal distribution of the mediating effect (Shrout & Bolger, 2002) and the risk of spuriousness. To test for the mediating effect of depressive symptoms, indirect effects will be reported, as well as 95% confidence intervals for the specific indirect effects.

## Results

Demographics are displayed on Table 1 and provide information about participants in RFS and participants in RFSH. Descriptive statistics are detailed on Table 2 and are provided for the study variables in RFS and RFSH. For the RFS sample, 69.3% of the households were identified as food insecure ( $n = 79$ ), and for RFSH sample, 30.9% ( $n = 42$ ). For the RFS sample, 47.4% ( $n = 47$ ) of mothers were at or above the cut-score (16) for depressive symptomology, and for RFSH, 20.1% ( $n = 27$ ) of mothers were at or above the cut-score (10). For RFS, the average medical hardship score was 1.28 ( $SD = 1.34$ ), for RFSH, 1.24 ( $SD = 1.21$ ). For RFS, the average child health problems score was .56 ( $SD = .92$ ), for RFSH, .60 ( $SD = .91$ ).

[Insert Tables 1 and 2 about here]

Correlations of study variables are found on Table 3, with RFS above the diagonal. For RFS, household food insecurity and medical hardship were significantly correlated ( $r = .30, p < .01$ ). For RFSH, household food insecurity and depressive symptoms were

significantly correlated ( $r = .21, p < .01$ ). Additionally, depressive symptoms and child health problems were significantly related ( $r = .20, p < .01$ ).

[Insert Table 3 about here]

The fit for the model using the RFS data was  $\chi^2(7) = 32.43, p = .0000$ ; CFI = 0.000, RMSEA = .18, indicating the model did not fit the data well. The model results are detailed on Table 4. For the RFS data, none of the variables were significantly associated with each other. For the RFSH data, the model fit was  $\chi^2(7) = 8.991, p = .25$ ; CFI = 0.86, RMSEA = 0.05 CI 90% [0.00, 0.12], indicating the model fit the data in an acceptable manner. Household food insecurity was related to depressive symptoms ( $\beta = .22, p = .04$ ) and depressive symptoms was related to child health problems ( $\beta = .21, p = .02$ ). There was a significant indirect effect of household food insecurity through depression to child health problems ( $B = .03, \beta = .05, 95\% \text{ CI } [.002, .09]$ ).

[Insert Table 4 about here]

## Discussion

Rural Latino families frequently experience many stressors, including those of household food insecurity and depressive symptoms that can affect child health (Ashiabi & O'Neal, 2007; Carmichael, Yang, Herring, Abrams, & Shaw, 2007; Skalicky et al., 2006; Cook et al., 2004; Ryu & Bartfeld, 2012; Caserta, et al., 2008). The material hardship of household food insecurity, along with maternal depressive symptoms is important to consider when examining child health outcomes. The Family Stress Model (Conger & Elder, 1994) is an applicable framework for this study because the stressors of household food insecurity, and medical need are examined in relation to maternal depression and child health problems.

The purpose of the study was to determine if maternal depressive symptoms served as mediator in the relationship between household food insecurity and child health problems. Maternal depressive symptoms was found to be a mediator, consistent with findings from Tinkew and colleagues (2007).

### **Limitations**

While this study contributes to the study of rural Latino families, there are limitations. First, purposive sampling was used, which makes the participants non-representative of the rural Latina population as a whole, and limits generalizability. Next, the data are self-reported by mothers, which may introduce self-report bias due to social desirability. Additionally, convergent validity is reduced, as each construct is measured by one scale. The measure of medical need was created by the researchers, and is not a standardized measure. The data are cross sectional and no causal or predictive claims can be implied. Finally, the small sample size increases the likelihood of Type II error, and there may have been significant results that were undetectable due to low power. A random sampling strategy, interviews with other family members, observational data, measurement of constructs in multiple ways, longitudinal design, and an increased sample size should be considered by future researchers. Nonetheless, despite these limitations, this study adds to the literature on rural Latino families and stress.

### **Conclusions**

In this study, higher levels of household food insecurity were associated with higher levels of maternal depressive symptoms, and maternal depressive symptoms were associated with an increase in child health problems. Professionals in health and mental health can work together to assess the stressors faced by families of rural Latino mothers.

Maternal depressive symptoms and household food insecurity can be measured during a child's well-check examination, and through this screening, professionals can refer families to appropriate resources.

All families deserve access to resources that support optimal physical and mental health, so they can function well as individuals. Two types of resources that are especially important for rural Latino families are access to food and mental health services. In addition to screening for household food insecurity, efforts to educate rural Latino families about potential food resources can include providing information about the Supplemental Nutrition Assistance Program, the Expanded Food and Nutrition Education Program (EFNEP) which influences family nutrition behaviors through education (NIFA, USDA, n.d.), as well as additional food resources such as food pantries and community gardens. Community gardens may be an especially viable option for rural Latino families who may value fresh food over prepackaged food (Gomel & Zamor, 2007; Greder, de Slowing, & Doudna, 2012). Culturally competent, bilingual professionals located in rural areas could provide mental health services to the predominately Spanish speaking Latino population, thus improving mental health through treatment of those with higher levels of depressive symptoms. One way to overcome the distance barrier inherent in rural areas and increase access to rural Latino families is through telehealth (Brownlee, Graham, Doucette, Hotson, & Halverson, 2010). Increasing the number of culturally competent, bilingual mental health professionals while increasing access to bilingual telehealth services are both necessary to ensure rural Latino families have improved access to mental health care in their communities.

Future research should further examine the role of maternal depressive symptoms as a mediator between household food insecurity and child health problems in applications of the FSM among rural Latina mothers. Child gender may also be of interest as a moderator. Researchers should also continue to parse out types of material hardships, as each may have unique associations with depressive symptoms and child health. A standardized measure of medical need is an area where researchers could contribute. Findings from this study suggest that associations between household food insecurity, maternal depressive symptoms and child health problems should be further explored in longitudinal studies so causal order can be determined.

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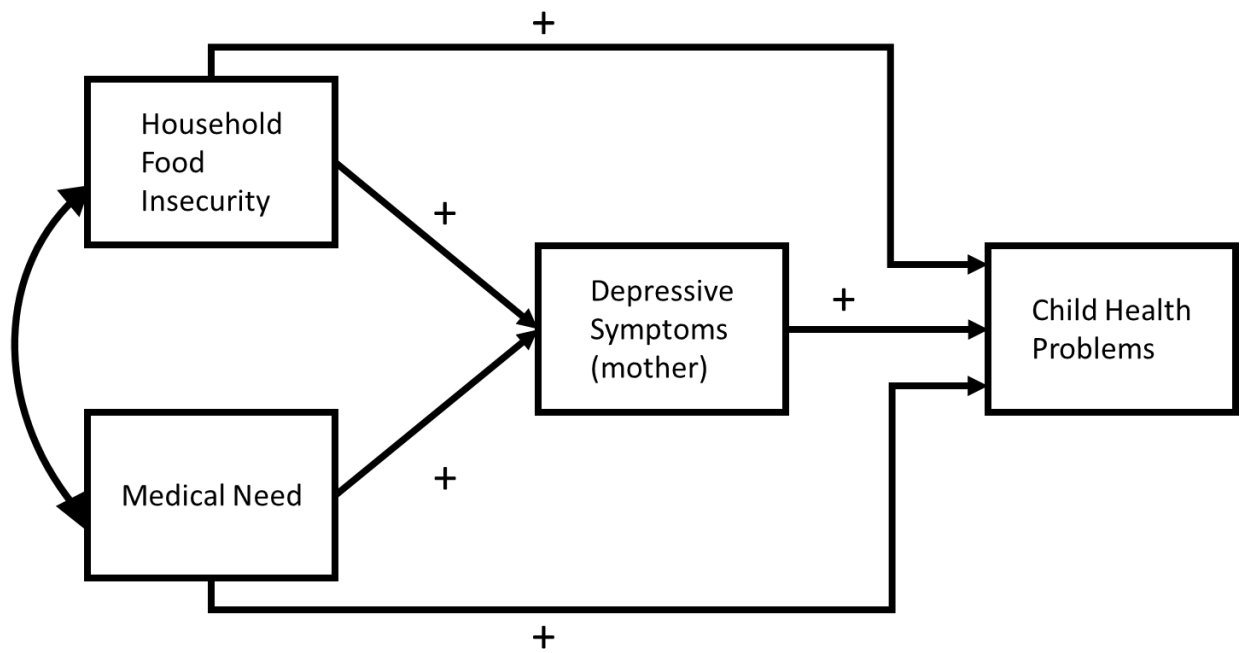


Figure 1

Conceptual model and hypothesized associations

Table 1

*Demographics by study RFS (RFSH in parentheses)*

Variable	Mean	SE	SD	N, %	Median
Child's age in years	9.68 (6.03)	.48 (.30)	5.10 (3.48)		
Child gender					
Boy				56, 47.5 (73, 53.7)	
Girl				62, 52.5 (63, 46.3)	
Mothers' employment status					
Employed				59, 49.60 (43, 31.6)	
Unemployed				60, 49.6 (93, 68.4)	
Mothers' age in years	31.54 (32.50)	.63 (.70)	6.76 (8.08)		
Mothers' education level					
8th grade or less				55, 47 (38, 27.90)	
Some high school				19, 16.20 (26, 19.10)	
High school				20, 17.1*(31, 22.80)	
GED				(14, 10.30)	
Technical, business or vocational training				6, 5.1 (7, 5.1)	
Some college				14, 12 (16, 11.80)	
Bachelors degree				2, 1.7 (4, 2.90)	
Graduate degree				1, .9 (0, 0)	
Family structure**					
Single				(10, 7.40)	
Divorced or widowed				(12, 8.80)	
Married				(72, 52.90)	
Civil union				(5, 3.7)	
Domestic partnership				(8, 5.9)	
Cohabiting relationship				(23, 16.9)	
Other				(6, 4.4)	
Total household income***	\$21,126.14	872.86	9521.77	20,784.00	(\$20,000 - \$24,999)

\* RFS education level high school and GED are combined

\*\*RFS family structure: 106 (89.10%) participants had a partner, 13 (10.90) did not.

\*\*\* RFS total annual income does not include food stamps. RFSH reported total household income as a range and included all sources of income

Table 2

*Descriptive Statistics for Study Variables for RFS and RFSH*

Variable	M	SD	n
<b>RFS</b>			
Depressive symptoms	8.46	5.20	108
Household food insecurity	1.33	1.48	114
Medical hardship	1.28	1.34	111
Child health problems	.56	.92	112
<b>RFSH</b>			
Depressive symptoms	6.37	5.16	136
Household food insecurity	1.09	1.49	136
Medical hardship	1.24	1.21	70
Child health problems	.60	.91	136

Table 3

*Correlations of Study Variables for RFS (above diagonal) and RFSH (below diagonal)*

Variables	1	2	3	4
1. Depressive symptoms	1	.13	.03	.10
2. Household food insecurity	.21*	1	.30**	-.15
3. Medical hardship	-.07	.15	1	-.01
4. Child health problems	.20*	.05	.15	1

Notes. \*, Correlation is significant at the .05 level (2-tailed).\*\*, Correlation is significant at the 0.01 level (2-tailed).

Table 4

*Unstandardized, Standardized, and Significance Levels for Model (Standard Errors in Parentheses)*

<i>Parameter Estimate RFS</i>	<i>B</i>	<i><math>\beta</math></i>	<i>p</i>
Household food insecurity → Depressive symptoms	.65 (.44)	.17	.14
Household food insecurity → Child health problems	-.12 (.07)	-.17	.11
Medical hardship → Depressive symptoms	-.10 (.48)	-.03	.83
Medical hardship → Child health problems	.002 (.09)	.002	.99
Depressive symptoms → Child health problems	.03 (.02)	.15	.16
<i>Parameter Estimate RFSH</i>			
Household food insecurity → Depressive symptoms	.76 (.36)	.22	.04
Household food insecurity → Child health problems	-.01 (.05)	-.01	.93
Medical hardship → Depressive symptoms	-.37 (.44)	-.09	.40
Medical hardship → Child health problems	.13 (.09)	.17	.16
Depressive symptoms → Child health problems	.04 (.02)	.21	.02
Specific Indirect Effects (Depression as Mediator)			95% CI*
	<i>B</i>	<i><math>\beta</math></i>	Lower, Upper
Household Food Insecurity to Child Health Problems	.03	.05	.002, .09
Medical Hardship to Child Health Problems	-.01	-.02	-.05, .32
<i>Note:</i> RFS $\chi^2(7) = 32.43, p = .0000$ ; CFI = 0.000, RMSEA = .18; RFSH $\chi^2(7) = 8.991, p = .25$ ; CFI = 0.86, RMSEA = 0.05 CI 90% [0.00, 0.12]. * Bias Controlled Bootstrap			



## **CHAPTER 4: GENERAL DISCUSSION AND CONCLUSION**

### **Discussion**

Rural Latina mothers contend with numerous stressors, such as household food insecurity and depressive symptoms that can affect child behavior (Whitaker, Philips & Orzol, 2006; Perez-Escamilla and Vianna, 2012; Coyne & Thompson, 2011; Goodman, Rouse, Connell, Broth, Hall & Heyward, 2011) and health (Ashiabi & O'Neal, 2007; Carmichael, Yang, Herring, Abrams, & Shaw, 2007; Skalicky et al., 2006; Cook et al., 2004; Ryu & Bartfeld, 2012; Caserta, et al., 2008). The purpose of this dissertation was to study relations between family and individual stressors and child outcomes using the Family Stress Model as a theoretical underpinning in two quantitative studies. The relations between the variables examined in this dissertation, and the findings, can be explained theoretical underpinnings of the Family Stress Model (Conger & Elder, 1994). Household food insecurity and medical need are viewed as material hardship stressors similar to Conger and Elder's (1994) concept of economic hardship, while maternal depressive symptoms are related to the construct of parental emotional and behavioral problems. Parenting alliance expands on the idea of degree of conflict between parents in the FSM, and the child behavior and child health outcomes in this dissertation are similar to child outcomes used in the FSM. The overarching research question for this dissertation examined the relations between stressors in rural Latino households and child behavior and child health. In study one, the researchers hypothesized that household food insecurity would be positively associated with maternal depressive symptoms and internalizing and externalizing child behaviors. It was predicted that maternal depressive

symptoms and parenting alliance would mediate the relationship between household food insecurity and child behaviors. In study two, the researchers hypothesized that food insecurity and medical need would be positively associated with depressive symptoms in mothers, and health problems in children. It was hypothesized that maternal depressive symptoms would mediate the relation between the material hardships of household food insecurity and medical need and child health.

In the first study, maternal depressive symptoms were related to a decrease in parenting alliance among mothers with children six to 12 years old. Neither maternal depressive symptoms, nor parenting alliance were found to be mediators for either age group. In fact, for the younger age group, there were no statistically significant results. This is contrary to the idea of sensitive periods in development occurring at younger ages, as it would be expected for stressors such as experiencing household food insecurity or experiencing parenting from a mother with depressive symptoms would impact child behavior at a young age.

In the second study, household food insecurity was significantly and positively associated with maternal depressive symptoms, and maternal depressive symptoms were significantly and positively associated with an increase in child health problems among the sample from RFSH data. Maternal depressive symptoms was found to be a mediator, which is consistent with prior research (Tinkew, Zaslow, Capps, Horowitz, & McNamara, 2007). The hardship of medical need was not found to impact maternal depressive symptoms or child health. In the sample from RFS data, none of the relations among variables were significant.

**Limitations**

While this dissertation contributes to the study of rural Latino families and stress, there are limitations as well. First, the participants in the studies included in this dissertation were purposively sampled, which makes them non-representative of the population as a whole, and thus, limits the generalizability. Next, the studies rely on self-report data, which may introduce bias due to social desirability. Each construct in the dissertation was measured by one scale, which reduces convergent validity. The measure of medical need was created by the researchers, and has not been tested in other populations, which could reduce reliability and validity. The dissertation uses data that are cross sectional, therefore, causal or predictive claims cannot be implied since temporal order is not established. Low power due to a small sample size in both studies likely contributed to Type II error, and thus, significant relations among variables were undetected. Empirical knowledge of rural Latino families can be strengthened by future researchers who consider attempting a random sampling strategy, interviews with other family members, observational data, measurement of constructs in multiple ways, longitudinal design, and an increased sample size. Despite these limitations, this study contributes to the literature on rural Latino families and stress. The exploratory studies in this dissertation have strengths. The well-known and widely tested Family Stress Model (Conger & Elder, 1994) is used to examine a difficult to sample and rarely studied population.

**Conclusion**

This dissertation found evidence that maternal depressive symptoms are associated with a decrease in parenting alliance among rural Latino mothers of children six to 12

years old, and household food insecurity was associated with maternal depressive symptoms, and maternal depressive symptoms were associated with an increase in child health problems. Collaboration among professionals across agencies that serve rural Latino families is necessary. Professionals such as doctors, nurses, couple and family therapists, and family life educators can work together to evaluate and help alleviate the stressors faced by families of rural Latino mothers, with a particular focus on maternal depressive symptoms, household food insecurity, parenting alliance and child health. Maternal depressive symptoms, household food insecurity and parenting alliance can be measured as a part of a child's well-check examination, and through this screening, health care professionals can connect families to suitable resources.

Individuals and families who have access to resources that support physical and mental health have more optimal functioning. Access to food and mental health services are two resources that are particularly central for rural Latino families. Not only can families be screened for household food insecurity, professionals can also include information about resources families may be eligible for, such as Supplemental Nutrition Assistance Program, the Expanded Food and Nutrition Education Program (EFNEP), food pantries and community gardens. As rural Latino families may value fresh food over prepackaged food, community gardens may be particularly beneficial resource (Gomel & Zamor, 2007; Greder, de Slowing, & Doudna, 2012). Spanish speaking Latina mothers with elevated depressive symptoms in rural areas can benefit from access to culturally competent, bilingual mental health professionals. Telehealth is one option to eliminate the barrier to services in rural areas and increase access to mental health services for rural Latino families (Brownlee, Graham, Doucette, Hotson, & Halverson, 2010). To ensure

rural Latino families gain access to necessary mental health services, whether in traditional office settings or through telehealth, there need to be initiatives to increase the number of mental health professionals who are both culturally competent and bilingual.

Future research should further examine maternal depressive symptoms, household food insecurity and child health in applications of the FSM among rural Latina mothers. Child gender may also be of interest as a moderator when looking at the outcomes of child behavior problems and child health. As researchers continue to explore material hardships, standardized measures for specific types of hardships should be developed, as different types of hardships may contribute to outcomes of interest in different ways. Findings from this dissertation suggest that associations between maternal depressive symptoms and parenting alliance, and associations between household food insecurity, maternal depressive symptoms and child health problems should be further explored in longitudinal studies so causal order can be determined.

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## APPENDIX

### IRB FORM

**IOWA STATE UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

Institutional Review Board  
Office for Responsible Research  
Vice President for Research  
1138 Pearson Hall  
Ames, Iowa 50011-2207  
515 294-4566  
FAX 515 294-4267

**Date:** 2/24/2011

**To:** Dr. Kimberly Greder  
1086 LeBaron Hall

**From:** Office for Responsible Research

**Title:** Latino Immigrants: Tracking the Effects of Changing Public Policies on Family Well-Being

**IRB Num:** 04-039

**Approval Date:** 2/24/2011

**Continuing Review Date:** 1/29/2012

**Submission Type:** Modification

**Review Type:** Expedited

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University. Please refer to the IRB ID number shown above in all correspondence regarding this study.

Your study has been approved according to the dates shown above. To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- **Use only the approved study materials** in your research, including the recruitment materials and informed consent documents that have the IRB approval stamp.
- **Obtain IRB approval prior to implementing any changes** to the study by submitting the "Continuing Review and/or Modification" form.
- **Immediately inform the IRB of (1) all serious and/or unexpected adverse experiences** involving risks to subjects or others; and (2) **any other unanticipated problems** involving risks to subjects or others.
- **Stop all research activity if IRB approval lapses**, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.
- **Complete a new continuing review form** at least three to four weeks prior to the **date for continuing review** as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Research investigators are expected to comply with the principles of the Belmont Report, and state and federal regulations regarding the involvement of humans in research. These documents are located on the Office for Responsible Research website <http://www.compliance.iastate.edu/irb/forms/> or available by calling (515) 294-4566.

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 1138 Pearson Hall, to officially close the project.



### PROTOCOL AMENDMENT FOR PERSONNEL CHANGES ONLY

Institutional Review Board

**RECEIVED**

FEB 21 2011

## 1. ADMINISTRATIVE

[General Instructions: Email the completed form to [IRB@iastate.edu](mailto:IRB@iastate.edu) or mail it to IRB Administrator in 1138 Pearson Hall.]

Protocol Number: 04-039

Protocol Title: Latino Immigrants: Tracking the Effects of Changing Public Policies on Family Well-Being

**Principal Investigator:**  
**Kimberly Greder**

**Phone:**  
**515-294-5906**

**Fax:**  
**515-294-5507**

**E-mail:**  
kgreder@iastate.edu

## 2. CHANGES IN NAMED PERSONNEL

[Refers to anyone who: obtains information about living individuals by intervening or interacting with them for research purposes; obtains identifiable private information about living individuals for research purposes; obtains the voluntary informed consent of individuals to be subjects in research, and studying, interpreting, or analyzing identifiable private information or data for research purposes. Changes in the principal investigator for a research study must be submitted on a new application.]

**Person/s Deleted:**

[illegible]

If you don't know your training date, contact the Office for Responsible Research for assistance.

## OFFICE USE ONLY

**APPROVAL SIGNATURE**

☒ All training requirements have been met.

IRB Reviewer Signature

Date \_\_\_\_\_

Office for Responsible Research: IRB 9/13/10

**IOWA STATE UNIVERSITY**  
OF SCIENCE AND TECHNOLOGY

Institutional Review Board  
Office for Responsible Research  
Vice President for Research  
1138 Pearson Hall  
Ames, Iowa 50011-2207  
515 294-4566  
FAX 515 294-4267

**Date:** 8/11/2011

**To:** Dr. Kimberly Greder  
1086 LeBaron Hall

**From:** Office for Responsible Research

**Title:** Rural Families Speak About Health

**IRB Num:** 10-321

**Approval Date:** 8/10/2011      **Continuing Review Date:** 8/17/2012

**Submission Type:** Continuing Review / Modification      **Review Type:** Expedited

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University. Please refer to the IRB ID number shown above in all correspondence regarding this study.

Your study has been approved according to the dates shown above. To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- **Use only the approved study materials** in your research, including the recruitment materials and informed consent documents that have the IRB approval stamp.
- **Obtain IRB approval prior to implementing any changes** to the study by submitting the "Continuing Review and/or Modification" form.
- **Immediately inform the IRB** of (1) all serious and/or unexpected adverse experiences involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.
- **Stop all research activity if IRB approval lapses**, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.
- **Complete a new continuing review form** at least three to four weeks prior to the date for continuing review as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Research investigators are expected to comply with the principles of the Belmont Report, and state and federal regulations regarding the involvement of humans in research. These documents are located on the Office for Responsible Research website <http://www.compliance.iastate.edu/irb/forms/> or available by calling (515) 294-4566.

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 1138 Pearson Hall, to officially close the project.

For IRB Use Only	Modification Approval Date <u>August 10, 2011</u>	RECEIVED JUL 27 2011 By IRB
	Continuing Review Approval Date <u>August 10, 2011</u>	
	Approval Expiration Date: <u>August 17, 2012</u>	

### ISU HUMAN SUBJECTS CONTINUING REVIEW AND/OR MODIFICATION FORM

TYPE OF SUBMISSION: ☐ Continuing Review ☐ Modification ☒ Continuing Review and Modification

Principal Investigator: Kimberly Greder		Phone: 515-294-5906
Correspondence Address: 56 LeBaron Hall		
Department: HDFS	E-mail Address: <a href="mailto:kgreder@iastate.edu">kgreder@iastate.edu</a>	
Project Title: Rural Families Speak About Health		
IRB ID: 10-321	Date of Last Continuing Review: March 17, 2011 (modification)	
Alternate Contact:	Phone:	
Correspondence Address:	Email Address:	
IF STUDENT PROJECT		
Name of Major Professor:	Phone:	E-mail Address:
Department:	Campus Address:	

#### FUNDING INFORMATION:

<input type="checkbox"/> External Grant/Contract	<input checked="" type="checkbox"/> Internal Support (no specific funding source) or Internal Grant (indicate name below)
Name of Funding Source:	OSPA Record ID on Gold Sheet:
<input type="checkbox"/> Part of Training, Center, Program Project Grant – Director:	Overall IRB ID No:
<input type="checkbox"/> Student Project—No funding or funding provided by student	

#### ASSURANCE

I certify that the information provided in this application is complete and accurate and consistent with proposal(s) submitted to external funding agencies. I agree to provide proper surveillance of this project to insure that the rights and welfare of the human subjects are protected. I will report any adverse reactions to the IRB for review. I agree that modifications to the originally approved project will not take place without prior review and approval by the Institutional Review Board, and that all activities will be performed in accordance with state and federal regulations and the Iowa State University Federal Wide Assurance.

  
 Signature of Principal Investigator

7/18/11  
7/18/11  
 Date

**Student Projects:** Faculty signature indicates that this application has been reviewed and is recommended for IRB review.

Signature of Supervising Faculty \_\_\_\_\_ Date \_\_\_\_\_

  
 IRB Approval Signature \_\_\_\_\_ Date August 10, 2011

For IRB Use Only	EXPEDITED per 45 CFR 46.110(b) <u>1</u> , Category <u>4.7</u> , Letter _____
	STUDY REMAINS EXEMPT per 45 CFR 46.101(b) _____
	WAIVER of SIGNED CONSENT per 45 CFR 46.117(c) <u>yes</u>
	WAIVER of ELEMENTS of Consent per 45 CFR 46.116 _____
	VULNERABLE POPULATION per 45 CFR 46. _____

**DIRECTIONS:** Section I: Key Personnel must be completed for all applications. Please complete Section II if this is an application for Continuing Review. If this is an application for continuing review and you will be modifying your project, please complete all sections of the form. If this application is only to request approval for a modification or change to your study, please complete Section I: Key Personnel and Section III: Proposed Modifications or Changes. Please answer each question.

**SECTION I: KEY PERSONNEL**

List all current members of the project personnel, including any additions and excluding any deletions as described in Section III. This information is intended to inform the committee of the training and background of the investigators and key personnel.

NAME & DEGREE(S)	POSITION AT ISU & ROLE ON PROJECT	TRAINING & DATE OF TRAINING
✓ Kimberly Greder, PhD	Associate professor and extension specialist; Oversee project; data analysis	9-19-00 human subjects training
✓ Christine Cook	Associate professor; Data analysis	9-19-00 human subjects training
✓ Samantha Young	Graduate student; Literature review; data management; data analysis	8-17-09 human subjects training; graduate student, data analysis, literature; qualitative research and quantitative research methods courses
✓ Andrea Bentzinger	Graduate student; Literature review; data analysis	1-25-07 human subjects training, graduate student, data analysis, literature, completed masters thesis; qualitative research and quantitative research methods courses
✓ Flor Romero De Slowing	Graduate student; Translation; transcription; literature review	2-11-10 human subjects training, graduate student, data analysis, literature, translation; qualitative research and quantitative research methods courses
✓ Samantha Trevino	Employed by Henry County- ISU Extension as a local interviewer for this research project	12-11-10 human subjects training; college coursework; training specific to interviewing
✓ Janet Smith	Families and youth program specialist for ISU Extension; Supervise Samantha Trevino; send completed interview forms and USB drives to ISU	12-10-10 human subjects training; completed masters degree;
✓ Angelica Reina	Graduate student ; Literature review	9/07 human subjects training graduate student, data analysis, literature, translation; qualitative research and quantitative research methods courses
✓ Kimberly Doudna	Graduate Student, data entry and analysis	8/19/10 human subjects training; Has completed HDFS 503 and 505 (quantitative methods courses)
✓ Julieta Parker	Employed by Henry County- ISU Extension as a local interviewer for this research project	Jan 4, 2011; trained by PI in interviewing techniques

If you don't know your training date, contact the Office for Responsible Research for assistance.